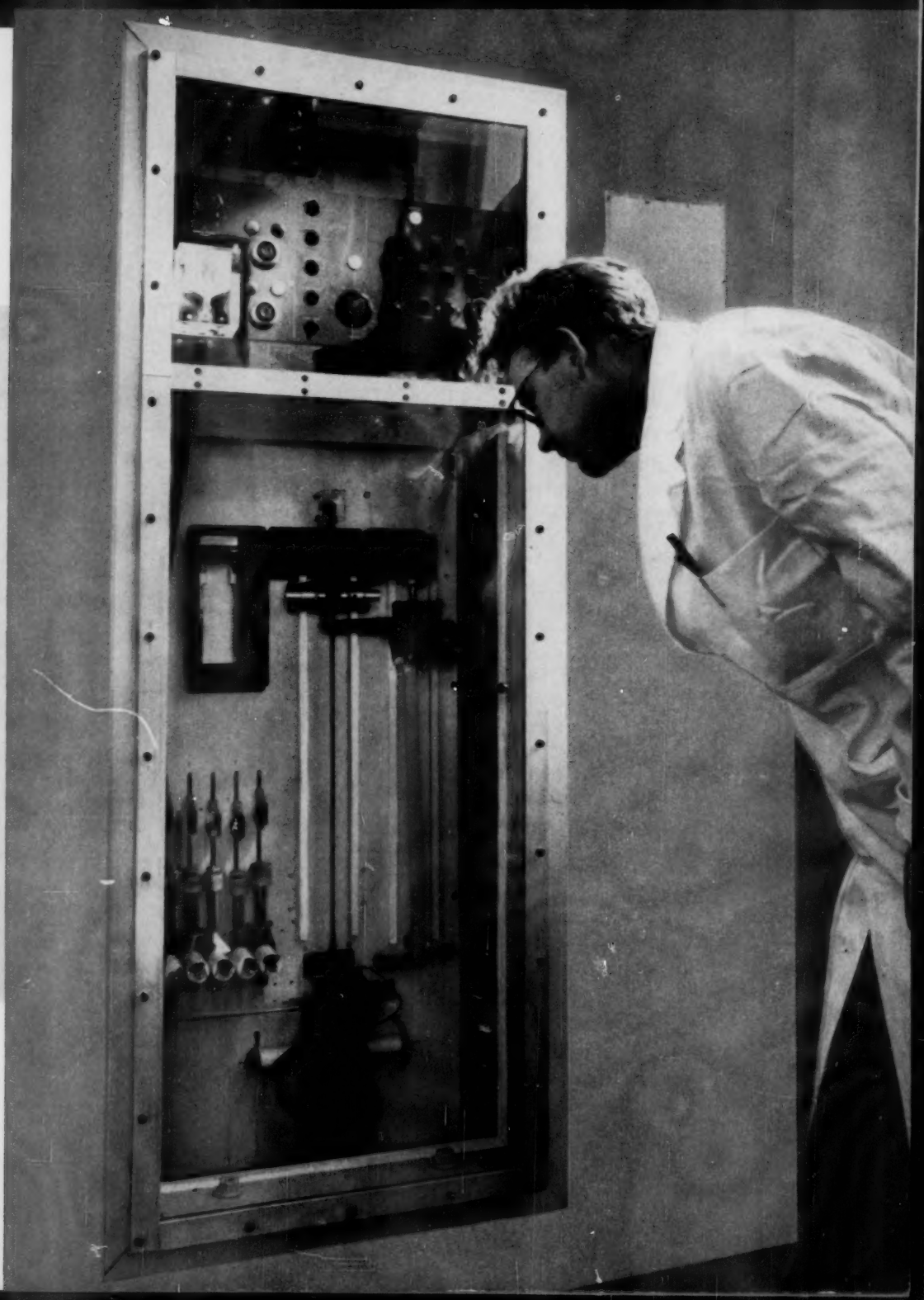
American Engineer



Automation . . . What Does It Mean Personally for the Engineer? "Automation Comes to the Chem Lab," Page 17, Relates An Actual Case ► ►

• • •

Now in the New AE! This Month and Every Month, More News on More Professional Subjects . . . More Stories of the Engineer and His Work for Our 50,000 *Readers*

On the Ohio Turnpike, every mile is

CONCRETE

the paving material with no "moving parts" to cause hidden wear!

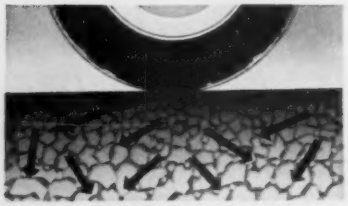


Diagram shows how flexible pavement parts must move. This grinds off corners of aggregate, destroys interlock, causes deep wear. Result: low spots, subgrade overloading, failure.

Diagram indicates stability of rigid concrete. There's no internal movement of aggregate and bond. One reason only concrete's load-bearing strength can be computed *mathematically*.

$7,181,898, based on first-cost estimates, was saved by choosing concrete. Now records show maintenance costs are running about *half the original estimates!*

More proof that concrete does the job—and does it for less money. Last year, Ohio's concrete Turnpike handled some 11¼ million vehicles—thousands with loads of 70,000 to 90,000 lbs.—saved money doing it.

There's a reason. Concrete is built to *bear* like a beam, not to *flex*. For flexibility means movement . . . movement creates friction . . . friction brings wear that causes a pavement to wear out *inside* as well as on the surface. That can't ever happen with concrete.

Stability helps give today's concrete its 50-year-plus life expectancy—and its lasting, flat smoothness. On new Interstate System highways, and on all heavy-duty roads, concrete means true economy both now and in the future.

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

FOR HIGHWAYS WITH A SOLID FUTURE...

Concrete

(Circle 1 on Readers' Service Card)

American Engineer

OCTOBER 1958
Vol. 28, No. 10

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

BPA
Member, Business Publications Audit

AMERICAN ENGINEER STAFF

Kenneth E. Trombley, Editor

John T. Kane, Assistant to the Editor

Paul E. Reece, Staff Writer and Production Assistant

AMERICAN ENGINEER COMMITTEE

G. Ross Henninger, P.E. Chairman
H. Carl Bauman, P. E.
Norman S. Bosworth, P. E.
Nelson S. Butera, P. E.
Frank W. Myers, P. E.

AE Professional News and Features

General News 7
Consulting 9
Education 11
Government 12
Industry 13
Registration 15
Society 38

Kansas Consultants Test State Society Functional Section 26
By Donald P. Schnacke, P. E., Secretary-Manager, Kansas Consulting Engineers' Functional Section

A Symposium: Professional Development of Engineering Students for Industrial Careers 31
By J. Neils Thompson, P. E., and C. Y. Thomas, P. E.

AE The Engineer at Work

Automation Comes to the Chem Lab 17
By Stanley P. Dodd, Technical Director, Chicago Apparatus Company

Our Radar Defense System 24

AE Regular Departments

Letters 4
This Month 5
Strictly Business 6
From Washington 21
New Literature 23
Meetings of Note 39
Classified 41
Dates to Remember 45
Professional Directory 46, 47, 48, 49, 50
Advertisers' Index 50
Progress in Products 51

ADVERTISING INFORMATION
American Engineer, 2029 K St., N. W., Washington 6, D. C.
Telephone: FEderal 7-2211

NEW YORK:
Austin LeStrange Co., Inc.
420 Lexington Avenue
New York 17, N. Y.
MUrray Hill 5-3277

CHICAGO:
LeStrange Co., Inc.
185 North Wabash Ave.
Chicago 1, Illinois
DEarborn 2-0248

LOS ANGELES:
Houston & Walsh
111 No. La Cienega Blvd.
Beverly Hills, Calif.
OLeander 5-8326

The American Engineer is published monthly by the National Society of Professional Engineers, 2029 K St., N.W., Washington 6, D. C., and printed by the National Publishing Company, Washington, D. C. Entered as Second Class Matter at the Post Office, Washington, D. C., under act of March 3, 1879. Copyright, 1958, by the National Society of Professional Engineers. Not responsible for opinions expressed in signed articles. Subscription Rates: $2 per year in advance to members of NSPE and its Affiliated Societies; $3 per year in advance to non-members in U. S. A. and its possessions, Canada and Mexico. Foreign, $4 per year. Single copy, 35c.

OFFICERS OF THE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Clark A. Dunn, P. E., Pres., Oklahoma State University, Stillwater, Okla. • Harold A. Mosher, P. E., Vice Pres., Kodak Park Works, Rochester 4, N. Y. • John B. McGaughy, P. E., Vice Pres., 220 West Freemason Street, Norfolk, Va. • Lindley R. Durkee, P. E., Vice Pres., 448 Federal Office Bldg., Seattle 4, Wash. • L. Eugene Easley, P. E., Vice Pres., 6511 Evanston Ave., Indianapolis, Ind. • W. L. Hindermann, P. E., Vice Pres., 1512 West California Ave., St. Paul 13, Minn. • Noah E. Hull, P. E., Vice Pres., Hughes Gun Company, Post Office Box 2539, Houston, Tex. • Garvin H. Dyer, P. E., Past Pres., Missouri Water Company, 123 West Kansas Street, Independence, Mo. • Russell B. Allen, P. E., Treas., 4610 Hartwick Road, College Park, Md., • Paul H. Robbins, P. E., Ex. Dir., 2029 K Street, N. W., Washington 6, D. C.

Letters to the Editor

The Senator Rebuts . . .

Dear Editor:

On page 49 of your August issue I find a letter from Leroy L. Simler, P.E., of Santa Ana, California. He feels sure that I am fighting for a non-existent cause and that I am completely misinformed as to the status of education in this country.

In the first place, let me say that my concern is not the concern of an observer in an ivory tower. I was first led to study present-day education by experiences in the education of my own children. I was led deeper into the subject by experiences in the education of my grandchildren. I was still more deeply submerged when I came to study the educational policies in my own town high school and in my own state. My concern therefore is immediate, personal, and practical.

I suspect that there are many in California who have had the same experiences and feel the same concern. My reason for believing this is that some thousands of my speeches on the subject have been requested by residents of California, particularly southern California. I am therefore led to believe that Mr. Simler must live in a delightful oasis in the desert of Californian modern education.

RALPH E. FLANDERS,
U. S. Senator from Vermont

Up to Industry . . .

Dear Editor:

Mr. William M. Redd, Jr.'s article "The First Assignment—A Challenge or a Bore?" (AE, Aug., 1958) demonstrated this gentleman's depth of insight into the mind and heart of the young engineer. But industry itself will shoulder the responsibility for raising the engineer's dignity and morale to proper heights, or stilting and frustrating that innocent will to "change the world" through its manipulations of the engineer's abilities.

WILLIAM J. BENNETT, E.I.T.,
New York, N. Y.

Registration Called First Step . . .

Dear Editor:

Are we penalizing the unity of the engineering profession because some of the older members of the technical societies were too short sighted in years past to become registered?

In the article by Walter J. Barrett in the July issue of AE, the author points out that AIEE is urging all of the young engineers in that Society to become registered as early in their careers as possible.

Some of us are against opening the membership in NSPE to non-registered engineers because of the fear of domination of NSPE by members who are not actively interested in promoting the economic and professional side of engineering. However, if the older non-registered members of the technical societies are actively supporting the registration, professional ethics, and improved economic status of engineers, we should create a grade of associate membership, with limited voting powers, to include such engineers. NSPE might open such associate membership only to members of such technical societies as are actively promoting professional engineering in their publications and through the action of their various boards.

Let's not handicap the future unity of our profession because of prejudices based on the lack of concern for economic and professional problems by certain technical societies in the past if they now actively support the beliefs of NSPE.

R. A. LONG, P.E.,
Sherman, Texas

On Kennedy-Ives . . .

Dear Editor:

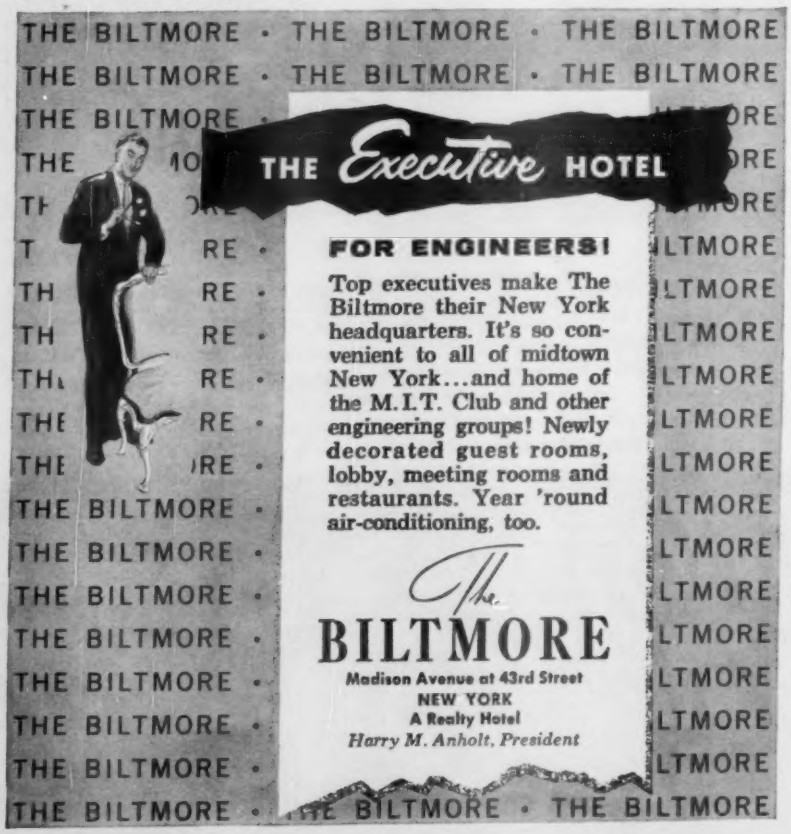
The "From Washington" column in the August AE represents excellent coverage by our correspondent Mr. Milton F. Lunch, of the controversial Kennedy-Ives Bill. Let us hope that it is thoroughly examined in Committee, and its fallacies exposed in time to circumvent its passage in its present form. . . .

Whether it is planned that way or not, this is but another device by which professional engineers are being driven from employment by construction contractors. One needs only to solicit employment as a construction contractor's engineer to find out about that. Now, if participation in union membership becomes mandatory, employment by construction contractors will become still less attractive to us.

We have plenty to offer that category of employers. Now, it is up to them to do their share of maintaining an atmosphere that is conducive to professional type performance in their behalf. Or, do they, as I am sometimes inclined to suspect, want it that way in order to exploit us? A declaration of contractors' thoughts about this is in order.

EDWARD M. RAUH, P.E.,
Tulsa, Okla.

► ***Editor's Note:*** **The K-I Bill went down in defeat in the final days of Congress.**


THE BILTMORE
THE Executive HOTEL
FOR ENGINEERS!
Top executives make The Biltmore their New York headquarters. It's so convenient to all of midtown New York...and home of the M.I.T. Club and other engineering groups! Newly decorated guest rooms, lobby, meeting rooms and restaurants. Year 'round air-conditioning, too.
The BILTMORE
Madison Avenue at 43rd Street
NEW YORK
A Realty Hotel
Harry M. Anholt, President

"This Month"

This is the new American Engineer; new in format, that is, the first major layout change in nine years. (Moves based on results of recent comprehensive survey of readers.) The change about will afford a more appealing presentation of all the features of the old setup and give an opportunity to add new ones. For example: all news on one subject will be gathered under one heading—Consulting, Registration, Industry, and the like. News stories will be better developed, present more facts, and there will be more of them. As for articles, professional ones will be maintained, continuing to give impetus toward Society goals—no major change here. But, remembering that engineers are technical men first, more stress will be placed on stories about them and their work. Not technical ones, that's not our bailiwick; but stories of accomplishment and endeavor. All in all, the new AE should be more satisfying with more pleasurable reading for the 50,000 who receive it every month. Readers' Service Card (inside back cover) is new, too, and will bring you fast information on advertisers' products. Use it.

This page, "This Month," will recap the issue. Read it first to discover in minutes what's between the covers of interest to you. Here is how October shapes up:

News "This Month" means National Engineers' Week, first of the professional weeks, now being followed by the lawyers with "Law Day." Importance is reflected in list of sponsors which this year includes Wernher von Braun, T. Keith Glennan, Charles Kettering, James R. Killian, and others.

In Consulting section, stories reveal survey taken by touring European engineers. They call American consultants "varied and prosperous." On Jenkins-Keogh, the bill did not make it in the last Congress. Consultants gird for new battle in January.

Education page headlines shift to engineering sciences in fall curricula—programs at several schools are reviewed.

The serious threat to professionalism posed in New York City has met violent opposition by engineers. Union there moves to organize engineers working for City. This in Government section.

Unionism news in Industry as well. Westinghouse Air Brake engineers have won right to determine future representation if any. Other news: Union hits NSPE stand on RCA strike. Reports show starting salaries now at $485. And utilities suffer in engineering procurement.

Registration developments include Arizona Supreme Court cases that deal with non-registered persons preparing drawings, a misconduct charge, and others.

Two "Engineer At Work" pieces of diverse interest: Automation Comes to the Chem Lab (practical data, a case history), and Radar Defense System—engineers solving materiel problems in the Arctic.

To wrap it up. A detailed piece on the Kansas Functional Section for Consultants . . . Society announces important intersociety fund raising drive . . . There's more news of recently completed Society film . . . Additional stories show Engineers' Week plans . . . Program is listed for important San Francisco meeting, Oct. 23-25. . . "This Month" says finis calling attention to the last two papers in the "Professional Development of Engineering Students" series.

Kenneth E. Trombley

Editor

Strictly Business

Personalities . . . **John A. Rhoads** has joined **Packard-Bell Electronics Corporation,** Los Angeles, Calif., as director of engineering on the Technical Products Division . . . **The Payne Company** has announced the promotion of **Orrin E. Burwell** to the La Puente, Calif., office as managing director of the Product Application and Engineering Department . . . **David C. Semonite** has been appointed engineer in charge of the new **Pratt, Read & Company** factory in Central, S. C. . . . **Theron A. Brown** has been elected president of the **Madison Gas and Electric Company,** Madison, Wisc. He was formerly chief engineer of the company . . . **William Rogers Wade,** consulting engineer, of Marysville, Mont., has returned from Cuba where he completed the design and supervised the erection of a large copper concentrator for the **Cia. Minera Buenavista, S. A.** . . . **W. T. Wessells** has been appointed sales engineer for the **Electric Distribution Products, Inc.** (a **Worthington** subsidiary) and will have his headquarters in New York City . . . **Robert C. Spencer, Jr.,** has been appointed turbine advance design engineer for **General Electric Company's** Large Steam Turbine-Generator Department, Schenectady, N. Y. . . . The **Ebco Manufacturing Company,** Columbus, Ohio, announces the appointment of **Richard J. Radcliffe** as assistant chief engineer-product development and test.

Mr. Rhoads

Arthur S. Ross has been promoted to manager of plant engineering and maintenance for **Philco Corporation's** Government and Industrial Division, Philadelphia, Pa. . . . **Anthony G. Profet** has been named research and development engineer, Jack Division, by **Duff-Norton Company,** Pittsburgh, Pa. . . . **William P. Henson** and **Milton N. Thompson** have joined the design engineering staff of **Mobile Drilling, Inc.,** Indianapolis, Ind. . . . **Herbert A. Fox,** formerly Eastern Division chief engineer for **L.O.F. Glass Fibers Company,** has been appointed to the newly-created post of director of licensing of the firm, it has been announced by **R. H. Barnard,** president. He will make his headquarters in the company's general offices in Toledo, Ohio . . . **Dr. Schrade F. Radtke** has been chosen to manage research projects under the direction of the Industry Development Committees of the **American Zinc Institute, Inc.,** and the **Lead Industries Association** . . . **Harold J. Flaherty** has retired after more than forty-one years of service with the **General Electric Company.**

Mr. Henson

Koehler Aircraft Products Company, Dayton, Ohio, has announced the promotions of **Donald J. MacFadgen** to vice president-engineering and **Harold A. Herkenhine** to chief engineer . . . **Edwin S. Bishop** has joined **Elof Hansson, Inc.,** Acoustical Division, New York, N. Y., as manager-engineering and research . . . **Larry S. Winston** has been named vice president-sales of **Gilmore Industries, Inc.,** Cleveland, Ohio . . . Brig. General **Terence J. Tully,** USA (Ret.), has been appointed manager of communications engineering, **RCA Service Company** Missile Test Project, Patrick Air Force Base, Florida . . . The appointment of **Theodore M. Pinney** as district engineer of **The Austin Company's** 14-state Cleveland District has been announced . . . **The Trane Company** has assigned **Richard F. Ferris** to its New York office as a sales engineer, it has been announced by Vice President **A. C. Menke** . . . **Frank H. Erdman** has been named president of **Kett Technical Center, Inc.,** research and development center of **U.S. Industries, Inc.** . . . **Charles E. Bowland** has been appointed East Coast field engineer for **Gulton Industries, Inc.** . . . **Howard S. Gleason** has been appointed manager of **Stromberg-Carlson's** Electronic Control Systems plant, Los Angeles, Calif. **Stromberg-Carlson** is a division of **General Dynamics Corporation.**

Mr. Winston

New Firms . . . Announcement has been made of the opening of the New York offices of **Schupack and Zollman,** for the practice of civil engineering, specializing in precast and prestressed concrete . . . **W. A. Hiers** has organized an engineering firm to be known as the **Hiers Engineering Company,** Consulting Engineers, with offices in Dallas, Tex. . . . **J. B. Shipp & Associates,** Consulting Engineers, recently opened offices in Lake Charles, La., and is chiefly an electrical and mechanical engineering firm . . . **Bertram W. Goodenough,** president; **Glenn F. Sudman,** vice president, and **S. Raymond Overholser,** secretary-treasurer, announce the formation of **Goodenough, Sudman and Overholser, Inc.,** Consulting Engineers, Sacramento, Calif.

Mr. Hiers

Reorganized . . . **Koch & Fowler,** consulting engineering firm in Dallas, Tex., has been reorganized as **Koch & Fowler and Grafe, Inc.,** it has been announced by **Adam K. Grafe,** new president of the company.

Prominent Sponsors Listed for National Engineers' Week

Fifteen leading engineering figures in a variety of fields have agreed to act as sponsors for the 1959 National Engineers' Week, February 22-28.

The list of sponsors is made up of engineers from industry, education, private practice, government service, and the military.

The fifteen sponsors are: Wernher von Braun, director, Development Operations Division, Army Ballistic Missile Agency; Allen B. DuMont, chairman of the board, Allen B. DuMont Laboratories, Inc.; T. Keith Glennan, president-on-leave, Case Institute of Technology, and administrator, National Aeronautics and Space Administration; Major General Emerson C. Itschner, chief of engineers, United States Army; Charles F. Kettering, General Motors Corporation; James R. Killian, Jr., special assistant to the President of the United States for science and technology; Clarence H. Linder, vice president, General Electric Company; Thomas E. Murray, consultant, Joint Committee on Atomic Energy; Granville M. Read, chief engineer, E. I. du Pont de Nemours and Company; Rear Admiral H. G. Rickover, chief of naval reactors, United States Atomic Energy Commission; Royal W. Sorensen, California Institute of Technology; Philip Sporn, president, American Gas and Electric Company; David B. Steinman, consulting engineer; Bertram D. Tallamy, Federal Highway Administrator, and Charles Allen Thomas, president, Monsanto Chemical Company.

Top: von Braun, Killian
Bottom: Murray, Read

Nuclear Society to Meet

Octave J. Du Temple, executive secretary of the American Nuclear Society, announced recently that Dr. L. R. Hafstad, research vice president of General Motors Corporation, and Walker L. Cisler, president of Detroit Edison Company, will serve as general chairmen of the 1958 annual meeting. This meeting, first to be held by the Society in Detroit, will run December 8-10 at the Sheraton-Cadillac Hotel. The three-day meeting will draw 1,400 engineers and scientists from the United States and Canada with representatives from European and South American countries.

Highlight of the meeting will be a complete report on the United Nations Second International Conference on the Peaceful Use of Atomic Energy just concluded in Geneva, Switzerland. Twenty-four technical sessions have been arranged featuring approximately 175 papers covering all phases of nuclear science and technology, including the development of nuclear rocket motors.

A.A.A.S. Engineering Program Announced

The National and International Aspects of Systems of Units in Coordinated Disciplines of Science and Technology will be the theme for the Section M-Engineering portion of the program for the annual meeting of the American Association for the Advancement of Science and will be held at the Hotel Statler in Washington, D. C., December 29-30.

A program has been designed to lay before the public a clear-cut picture of the systems of measurement now in use in various parts of the world and the need for clarification and understanding to permit the greater interchange of knowledge and to aid and assist industry and commerce.

Competition Opens For Bridge Design

A steel highway bridge design competition offering fifteen awards totaling $44,000 to engineers and college engineering students is being sponsored by the American Bridge Division of United States Steel Corporation, it has been announced by Austin J. Paddock, Division president, and L. Abbett Post, executive vice president of the American Institute of Steel Construction, who will administer the program.

The competition is dedicated to the stimulation of the best use of steel in the design of bridges for the 41,000-mile system of interstate and defense highways to be built during the next fifteen years.

It has been estimated that more than one bridge per mile of road will be required to complete the vast network of highways that will link all parts of the nation.

"Being the strongest and most versatile construction material, readily available and familiar to all engineers, steel will save the program many a day and dollar in the next fifteen years," Mr. Paddock said. "But we in American

Professional Liability Insurance
FOR ENGINEERS AND ARCHITECTS
As Commended by the Board of Directors of the National Society of Professional Engineers
VICTOR O. SCHINNERER AND COMPANY, INC.
Republic 7-1929 Investment Building, Washington 5, D. C.
(Circle 2 on Readers' Service Card)

Bridge are convinced that steel can contribute even more if the engineering mind is stimulated to a more imaginative and effective use of its abundant properties."

Open to professional and design engineers and to college engineering students, the competition poses the problem of designing an overpass structure in steel to carry a two-lane highway at right angles over a four-lane interstate highway on level ground. The overpass must be designed in accordance with standards developed by the American Association of State Highway officials and approved by the U. S. Bureau of Public Roads. These standards are entitled "Geometric Design Standards For National System of Interstate and Defense Highways."

Eight awards will be made for winning entries submitted by professional and design engineers, including a top award of $15,000. Other grants in this category will include $10,000 for first honorable mention, $5,000 for second honorable mention, and $1,000 each for five third honorable mentions.

College engineering students will compete for $9,000 in awards, with the first award being $4,000. Also to be given are $2,000 for first honorable mention, $1,000 for second honorable mention, and $500 each for four third honorable mentions.

All entries will be judged on the basis of originality of design, utilization of the properties of steel, economy, and appearance of the structure. The type of overpass structure, length of spans, and other factors will be left to the discretion of the entrant.

Complete information on the competition may be secured from American Bridge Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, and from the American Institute of Steel Construction, 101 Park Avenue, New York 17.

Consultant Held Liable For Professional Error

A supervising architect's negligent breach of his contract with the owner of a construction project gives rise to an actionable claim for damages in favor of a stranger to the contract who suffered financial injury as a result of the architect's lack of due care. Consequently, said a Federal district court recently in California, the architect's motion for dismissal of the complaint will be denied.

The case arose when a subcontractor brought action against the prime contractor on a Federal Government school construction project for sums allegedly due for labor and materials furnished by the subcontractor. The prime contractor filed a counterclaim against the subcontractor and against the Government's architect for the project claiming that certain concrete furnished by the subcontractor was not up to specification and that it was incorporated into the building due to the negligent supervision of the architect who should have known from various test reports that the concrete was not up to standard. The prime contractor based his claim for damages upon the fact that the state agency subsequently refused to approve the work, requiring him to compensate for the defective material with its consequent delay in completion of the contract.

The architect, on the other hand, asserted that he was not negligent, but in any event, that he owed the prime contractor no duty to perform the architectural services with any particular degree of care, since no contractual relationship existed between him and the prime contractor. The architect maintained that his duty to use due care was only owed to the United States, the party with whom the architect had contracted.

Disagreeing with the architect, and basing its decision on California law, the Federal district court stated: "Considerations of reason and policy impel the conclusion that the position and authority of a supervising architect are such that he ought to labor under a duty to the prime contractor to supervise the project with due care under the circumstances, even though his sole contractual relationship is with the owner, here the United States. Altogether too much control over the contractor necessarily rests in the hands of the supervising architect for him not to be placed under a duty imposed by law to perform without negligence his functions as they affect the contractor. The power of the architect to stop the work alone is tantamount to a power of economic life or death over the contractor. It is only just that such authority, exercised in such a relationship, carry commensurate legal responsibility."

Concluding under the circumstances that the prime contractor had an actionable claim for damages against the architect, the court went on to further state: "The fact that the architect is retained by the United States makes no difference. Indeed this circumstance increases the need for the exercise of due care by the architect in his actions affecting the contractor, because the Government usually is in an even stronger position than others to insist that the work be done strictly according to specifications and that the contractor bow to the supervision of the architect." (*U. S. v. Rogers & Rogers*, 161 F. Supp. 132.)

Consultants Called Varied, Prosperous

The working methods and conditions of American consulting engineers was the subject of a special study conducted by representatives of seven European countries during a six-week tour of the United States. Sponsored by the Organization for European Economic Co-operation, the touring group was composed of consulting engineers, plant designers, construction contractors, and industrial equipment manufacturers. The information and impressions gained by the visitors have been published in a 116-page booklet under such chapter headings as legal background of consulting engineering, organization and ethics, contracts and fees, finance, services rendered by firms and structure and internal organization.

The Mission (as the traveling group was called) studied "engineering" strictly in its American sense, which they describe as the provision of designs and plans, as distinguished from England, for example, where engineering almost invariably denotes construction. The group notes that consulting engineers form only one group among the many different types of organizations which perform engineering activities, and the many different methods of organizing engineering activity and of supplying engineering services existing side by side, is viewed by the group as "a healthy feature of the American economy."

As indicated in the report, the general impression gained by members of the Mission is that consulting engineers and firms in the United States are very numerous, very varied in character and size, and well developed, organized and prosperous. The group further sees a general tendency in this country toward specialization, contrary to the European engineer, and a broad opportunity for expansion in the public utility field, which is not nationalized here as is true in many European countries.

Sums Paid for Favors Non-Deductible Now

One of the sections of a comprehensive technical tax adjustment bill signed by the President adds a new provision to the Internal Revenue Code to provide that sums paid directly or indirectly to officials or employees of foreign governments for the procurement of contracts, favors or special concessions can no longer be deducted as ordinary and necessary business expenses. Previously, the position of Internal Revenue Service had been that such expenditures could be considered as ordinary and necessary business expenses where the foreign government itself demanded or acquiesced in the payment. Henceforth, under the new law, improper payments to foreign government officials may not be treated as properly deductible expense items irrespective of the position which the foreign government may take with respect to such payments. The new ruling will apply whether payments are made in this country or abroad, and whether such payment is considered lawful or unlawful in the foreign country.

Court Holds Engineer Must Have License

A non-registered person, doing business as an engineering and contracting company, who actually performed engineering services, advertised himself as a consulting engineer in the local telephone directory and solicited public acceptance of his engineering services, was permanently enjoined from such further activities by a Kansas District Court until such time as he should qualify for and obtain an engineer's license in the State. The case arose when the Consulting Engineers Section of the Kansas Engineering Society, after thorough investigation, intervened on behalf

Free
send for the most widely used
ELECTRONIC SUPPLY GUIDE
ALLIED'S
COMPLETE 452-PAGE
1959 CATALOG
send for it!
ALLIED RADIO
1959
ALLIED RADIO
your buying guide to the world's largest stocks of
ELECTRONIC SUPPLIES FOR INDUSTRY
• Transistors & Diodes
• Relays & Switches
• Receiving & Power Tubes
• Tools & Hardware
• AN Connectors
• Transformers
• Racks, Cabinets, Chassis
• Test Equipment
• KNIGHT Public Address & Paging Systems
Simplify and speed your purchasing of electronic supplies and equipment at ALLIED. We make fast, expert shipment from the world's largest stocks of everything in Electronics. OEM prices are available on quantity purchases. Send today for your FREE 1959 ALLIED Catalog —the complete Buying Guide to Electronic supplies for Industrial and Communications use.
One Complete Dependable Source for Everything in Electronics
ALLIED RADIO
100 N. Western Ave., Dept. 116-K8
Chicago 80, Illinois
our 38th year
send for FREE catalog
(Circle 3 on Readers' Service Card)

of the safety and welfare of the public and filed a formal protest with the Kansas Attorney General, who in turn filed a petition in the name of the State for an injunction restraining the defendant from the further practice of engineering and from advertising and using the name "engineering" in his business.

Finding the defendant to be without lawful authority or right to practice engineering within the State, the Court signed a permanent injunction order based on several activities of the defendant, each of which constituted a violation of the Kansas statute.

First, the defendant contracted with the Southwestern Bell Telephone Company to place advertisements in the yellow section of the Wichita Directory which were to include approximately 114 listings under a like number of subject matters of his "engineering and contracting company." In addition, approximately eighteen of these listings were classified under an equal number of professional engineering classifications. Such advertisements, the Court found, tended to convey the impression that the defendant, through the name and description he had adopted, was conducting his business as a professional engineer, in violation of the Kansas law.

Secondly, the Court found that the defendant had solicited public acceptance of his engineering services in that he had submitted a written proposal, on letterhead stationery, for engineering work which included the quotation of prices for "Field Party (crew, truck, equipment) Office and Bench Time (per man hour)." This offer of engineering services was also confirmed by the Court as being in violation of certain sections of the Kansas Act.

Finally, it was determined that the defendant actually had performed certain engineering jobs, including the design for a fee of a burglar and smoke alarm system for a commercial establishment which, being classified as an electrical plant that utilizes electrical energy, fell within the definition of professional engineering. Since the laws of Kansas require that persons who practice professional engineering must be licensed, the defendant, not being so licensed, violated the Kansas statute on this account also.

The proceeding to curtail the unauthorized practice of engineering, was the first case of its kind that the professional engineers of Kansas have ever brought into the courts. It was done, according to the Kansas Functional Section, for the purpose of placing state wide emphasis on this matter and to serve as a deterrent to future violations.

Consultants Gird For Jenkins-Keogh Fight

The Jenkins-Keogh Bill, which would permit self-employed professionals and others, including consulting engineers, to deduct up to $2,500 annually paid as premiums on a restricted retirement policy or as deposits in a restricted retirement trust fund, did not achieve final passage when Congress adjourned on August 24th. After having previously passed the House on July 29th by an overwhelming voice vote, the Bill was held up by the Senate Finance Committee where it languished without hearings.

A move to secure passage was made on the Senate floor when Senator Potter of Michigan offered the Jenkins-Keogh Bill as an amendment to a technical tax revision bill then under consideration. However, a point of order was made that the Potter amendment was "not germane" to the technical tax bill, and after a roll call vote on the parliamentary question, Potter's amendment was not allowed to reach a vote on the merits.

Reports indicate that had the Senate been given an opportunity to vote on the merits of Senator Potter's proposal, it would have been approved by a decisive margin. The American Thrift Assembly, which has led the fight to have the Jenkins-Keogh Bill enacted into law, is not undaunted by this development according to a statement issued by Robert C. Vogt, NSPE representative to the American Thrift Assembly. To the contrary, the progress achieved this year is an encouraging sign, Vogt said, for it represents a popular favorable sentiment among members of Congress toward the Jenkins-Keogh principle. The American Thrift Assembly is tentatively planning its campaign for the next session of Congress which will commence on January 7, 1959, when again a total victory will be sought.

Gates Names Officers

Leslie C. Gates, chairman of NSPE's Functional Section for Engineers in Private Practice, has announced the names of chairmen for each of the Section's continuing task forces. Their names and addresses follow:

Task Force No. 2—Fee Schedules: Frank Sanford, 209 East Washington Avenue, Jackson, Michigan.

Task Force No. 3—Ethical Practices: Philip W. Genovese, 294 Elm Street, New Haven, Connecticut.

Task Force No. 4—Liability Insurance: Arlow V. Ferry, P. O. Box 8405, Kansas City 14, Kansas.

Task Force chairmen will welcome all comments and suggestions regarding Functional Section activities and programs, Gates said.

Security Bill Benefits

The Social Security Bill recently signed by the President makes several important changes in existing law which are significant for consulting engineers. One provision of the Bill raises the rate for self-employed persons covered by the system from 3⅜ per cent to 3¾ per cent beginning in January, 1959.

Another will allow retired persons to earn as much as $100 per month in addition to their pensions without losing any Social Security benefits. Under existing law, when retired people earn more than $1200 a year, benefits may be witheld for any month in which earnings exceed $80. The new law raises this monthly figure to $100.

Shift to Engineering Sciences Seen this Fall

There appears to be a "new look" in engineering education this fall with a number of schools adding engineering sciences to their curriculum.

At Swarthmore College, an Honors Program in Engineering Sciences has been injected into the engineering division curriculum. The new program, announced by President Courtney Smith, will cut across traditional departmental divisions of subject matter such as civil, mechanical, and electrical engineering. It will stress basic disciplines and fundamentals needed by all engineers with emphasis on the physical sciences and mathematics.

This increased emphasis on the basic scientific disciplines rather than on specialized technical subjects recognizes the unprecedented advance in the sciences in recent years. Dr. Smith predicts the program will give the engineering graduate the adaptability, the spirit of inquiry, and the fundamentals emphasizing "why" rather than "how" that will enable him to keep abreast of scientific developments and to contribute more effectively to a rapidly changing economy.

"We anticipate that the graduate of our Honors Program will be a better brand of engineer," said Dr. Smith, in describing the details of the program. The sciences fundamental to civil, electrical, and mechanical engineering—physical sciences, engineering sciences, and mathematics—will be studied intensively in the framework of the Honors plan of study which was first established at Swarthmore in 1922. The plan enables gifted students who have the maturity and capacity to do independent work to meet in seminar groups of from five to seven students for six to nine hours each week under the directions of an instructor. Each student will take two such seminars each semester in his junior and senior years. Thus, Honors students during these last two school years are freed from standard academic procedures such as courses, credit, and grades, but at the end of their senior year they must take written and oral examinations, covering their two years' work and given by visiting examiners from other educational institutions.

A new undergraduate curriculum in engineering sciences has also been announced by Illinois Institute of Technology.

The program, leading to a Bachelor of Science degree in engineering sciences, will stress mathematics and science and basic courses in several phases of engineering according to Dr. Ralph G. Owens, dean of engineering and co-chairman of the IIT Curriculum Committee.

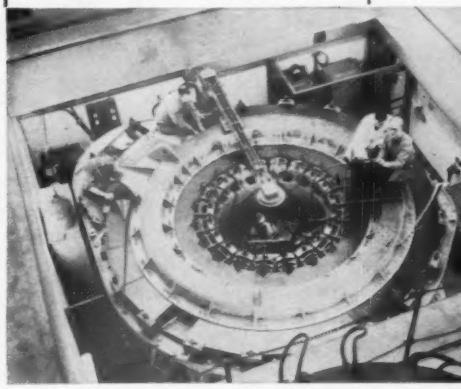
The new curriculum is designed to satisfy growing demands from industry and government for men trained to develop and apply fundamental engineering knowledge, Dr. Owens said.

"As a result of this basic training in engineering and science, Illinois Tech will produce an engineer-scientist who is capable of working in many fields, including relatively new ones such as automation, electromechanical computation, and rocket and nuclear research," he explained.

Under the new program, courses in the engineering sciences—heat transfer, thermodynamics, electrical theory, properties of materials, and advanced mechanics—will be stressed.

An integral part of the curriculum is elective sequences which produce a concentration in an engineering or science field. This concentration enables the graduating student to advance either to industry or to graduate school in that particular field.

Emphasis on Atom at Glasgow Univ.



With half of its research students today engaged in the study of atomic disintegrations, the University of Glasgow, Scotland, continues its tradition of academic stress on the atom. The word "isotopes," meaning substances having different atomic weights but the same chemical qualities, was coined at the University in 1913.

Newark Offers Sales Conferences

Newark College of Engineering has announced its thirteenth series of Sales Engineering Conferences consisting of twelve weekly, two-and-a-half hour sessions on Tuesdays from 7:00 to 9:30 p. m., which began September 23 at the college.

Designed to train sales engineers to market a wide range of engineering products, each conference will feature a guest speaker who is working in industry and thoroughly experienced in his field. Among the topics scheduled for discussion are: How the Sales Engineer Should Function, How to Analyze and Work Your Territory Effectively, How to Improve One's Selling Personality and How to do a Better Selling Job.

BOOK MANUSCRIPTS
CONSIDERED
by cooperative publisher who offers authors early publication, higher royalty, national distribution, and beautifully designed books. All subjects welcomed. Write or send your manuscript directly.
GREENWICH BOOK PUBLISHERS
Attn. Mr. Zeeber 489 Fifth Avenue
New York 17, N. Y.

(Circle 4 on Readers' Service Card)

Unionization Faces N. Y. C. Engineers

- NYSSPE Moves to Avert Action
- Adopt Resolutions at Utica

The New York State Society of Professional Engineers has moved swiftly and decisively to meet a threat to unionize professional engineers in the employ of the City of New York. The action came at the NYSSPE Autumn meeting in Utica, N. Y., following the receipt of information that a local of an AFL-CIO union had filed a petition with the city's labor commissioner to represent approximately 5,000 city employees in engineering and technician jobs. About 500 of the affected employees are professional engineers, all of whom are reported to be registered as P.E.'s under the city's civil service requirements.

The backdrop for the Society's action was the issuance of an executive order by Mayor Wagner last March, establishing policy and procedures to permit city employees who desired to do so to select a representative for collective bargaining purposes. The Mayor's order and subsequent procedural regulations establish the right for city employees, with certain exceptions, to secure bargaining rights or to refrain from collective bargaining. The key to the professionals' problem is the ascertainment of an "appropriate unit" for voting purposes to indicate the wishes of the employees.

Resolutions adopted at the Utica meeting stated that NYSSPE believes the professional employees should be considered separate and apart from nonprofessionals for voting purposes, and called upon the Mayor and other city officials to grant the professional engineers in the city's employ a separate vote if an election is ordered on the basis of the petition to represent a mixture of professionals, technicians, nonprofessionals, etc. The Employment Practices Committee commented on this point, "If we don't the ALF-CIO will." The meeting authorized NYSSPE President L. E. St. John to proceed with the plans to meet the challenge.

It was pointed out that the effort to unionize New York City's professional engineers is not the first attempt to bring municipal engineers into union ranks, and it may be expected that similar moves will be made in other cities. Of some value for precedent is the collective bargaining contract covering city employees of Philadelphia which specifically excludes professional employees.

Spurred by the threat in New York City, the state group moved on a broader front to deal more effectively with the problems of P.E.'s in governmental employment. A further resolution said the New York Society is desirous of assisting professional engineers in the solution of their problems, in a manner consistent with state and national policies and ethical standards. The action pledged the NYSSPE to establish appropriate facilities to aid the chapters, whenever possible, in the resolution of professional employment problems.

The Employment Practices Committee added in their report, as approved by the Board of Directors: ". . . this Society is ready and willing to aid Professional Engineers in the solution of problems which involved employment practices. In effect, the Society should aid the professional engineers in solving their professional problems with their employers in a manner consistent with professional ethics." Among other steps planned by the Committee are contact with employers to inform them more fully of the long-range advantages of full professional treatment of professional employees; investigate the use of nonlicensed engineers in supervisory positions in civil service and private practice, and institute a program to eliminate such abuses. The group's report added that its members "are unanimous in the opinion that the Society would actually serve the profession in an area that has long been overlooked or perhaps 'where we have feared to tread.' What better way is there to offset the inroads of unionism, to increase our membership and serve our Profession and the Public?"

Union Threat in New York

City of New York engineers faced with problem of unionization.

The next step in the New York City situation will probably be a hearing before the Commissioner of Labor to determine an appropriate unit for voting purposes. Under the program adopted at Utica the NYSSPE will take a leading role at the hearing to protest vigorously any attempts to lump the professionals with others in the vital and far-reaching decision of whether professionals are to seek the solution to their professional problems through their professional society and within the bounds of professional ethics, or through a labor union. The answer to that question in New York City will have national repercussions.

Westinghouse Engineers Ask Choice of Representation Now

- Have Been Represented by Union
- Labor Board Defines Professionalism

Professional engineers employed by Westinghouse Air Brake Company at Wilmerding, Penna. have won the right to determine whether they wish to continue representation for collective bargaining by a heterogeneous union, Westinghouse Air Brake Office and Technical Union. The professional employees, represented by the union since 1945, filed a petition for a new election with the NLRB, coincident with the expiration of the union's contract with the company last June. The engineers' petition granted by the NLRB will permit the choice of representation by the heterogeneous union, a new Engineers Professional Association or neither.

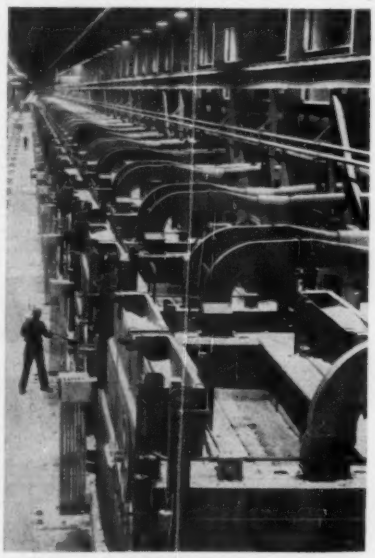
In determining the make-up of the new professional unit, the Board placed heavy emphasis on formal educational activities and collegiate degrees, noting in most instances that the occupants of positions held to be nonprofessional did not have degrees from accredited educational institutions of higher learning. Some of the classifications found to be nonprofessional, for example, included equipment planning engineer, plant engineer, metallurgists, tool standards engineers and technical writers. The implication of these NLRB holdings is that neither evening nor part-time formal study, nor in-plant training will suffice under the professional definition in the Taft-Hartley Act. (Westinghouse Air Brake Co., Air Brake Div. and Industrial Products Div., 121 NLRB No. 77, 6-RC-2108.)

Union Attacks NSPE's Stand on RCA Strike

The statement by NSPE President Clark A. Dunn on the recent two-week strike by the Association of Professional Engineering Personnel at RCA's Camden area operations (printed in last month's AMERICAN ENGINEER) has evoked further comments by several engineering unions. The Engineers and Scientists of America, with which APEP is affiliated, attacked NSPE's position as a "carefully worded restatement of that organization's well-known anti-collective-bargaining-for-engineers attitude . . ." but claimed that effective communications between engineers and management, advocated by NSPE as the proper approach to personnel relations, can best be achieved through collective bargaining.

A former ESA affiliate—TVA Engineers Association—said that the strike exposes the ESA prior contention "that as professional people they were above the use of this weapon." The West Coast Engineers and Architects Association, another former ESA affiliate, defended the strike weapon and added that unionism is the only means for effective communication between working engineers and management.

Industrial "Kitchen"



These 1296 aluminum pots at Kaiser Aluminum's Chalmette, Louisiana, plants use only one recipe—two pounds of alumina, 8½ kilowatt hours of electricity and 0.6 pounds of carbon—to produce one pound of aluminum. Together they turn out 247,000 tons a year, tops in the nation.

Court Rules Group Is Not a Union

A recent decision of the United States Court of Appeals for the Fifth Circuit indicates that an employee-management committee that

HOW TO FILE ROLLED MAPS, TRACINGS AND BLUEPRINTS
1. GAIN ROOM
2. PROTECT MAPS
3. FIND MAPS FAST
ENGINEERS IN ALL FIELDS HAVE PROVED IT WITH THE NEW V-80 MAP RACK BY...
kraftbilt
ROLL THIS NEW FILING DEVICE RIGHT TO YOUR DESK OR DRAWING BOARD
WRITE NOW FOR CATALOG 58-BE
ROSS-MARTIN CO.
Box 800 Tulsa 1, Okla.
HOLDS 80 ROLLED MAPS, BLUEPRINTS

(Circle 5 on Readers' Service Card)

avoids collective bargaining, has no bargaining power and is merely a forum for discussion of matters of mutual interest to employees and employer is not a "labor organization" (union) under the Taft-Hartley Act. A lack of clarity in the interpretation of the law on this point has been a factor in the development and operation of so-called "sounding board" associations of engineering personnel. Concluding that the employer did not commit an unfair labor practice by giving assistance to the employee committee and discussing with it matters of mutual interest, the Court stated that "it seems fundamental to the sense of the situation that a group of employees is not a labor organization unless it exists for the purpose of negotiating or bargaining with employers. Of course, if an employee committee in fact negotiates or bargains, whatever its name or by-laws, it is a labor organization [union]."

Now Available! FREE!

A New ALVIN Ready Reference Chart With Decimal Table

Here's a fully illustrated reference chart showing complete Alvin line for engineers, draftsmen, architects, etc. Includes a handy Decimal Chart. Tack on wall or file in drawer. See Alvin's complete line at your dealer or write for Alvin Ready Reference Chart TODAY!

America's Most Complete Line of

Drawing Sets — Drafting Materials
Drafting Instruments — Drawing Equipment
Designing Aids — Measuring Devices

"QUALITY AT THE RIGHT PRICE"

ALVIN & COMPANY, INC.
Windsor, Conn.

(Circle 6 on Readers' Service Card)

Utilities Report Engineer Demand

A special committee of the National Association of Railroad and Utilities Commissioners reports a serious problem faced by utilities bodies in procuring and training engineering personnel. The NARUC group found 118 vacancies among 53 commissions employing 768 engineers, and estimated that 313 engineers will be needed for replacements during the next ten years, plus 107 additional engineers for increased regulatory work. The study group report covers detailed findings and recommendations on recruiting, salaries, employment conditions and training. For further information, contact NARUC, P.O. Box 684, Washington 4, D. C.

Starting Salaries Rise to $485

Sixteen top engineering schools surveyed by the College Placement Council show engineering starting salaries at $485 a month, up $20 from last year. The Factory Mutual Engineering Division study shows the U.S. monthly average at $468 (civil) to $491 (electrical) by branch. Lehigh University reports engineering starting salaries at $474, compared to $465 in 1957. Average starting pay for January and June engineering graduates at Illinois Tech was $470 a month—the same as last year. However, electrical engineering graduates reached $515 a month in 1957, dropping to $470 in 1958.

General Electric Offers Graduate Fellowships

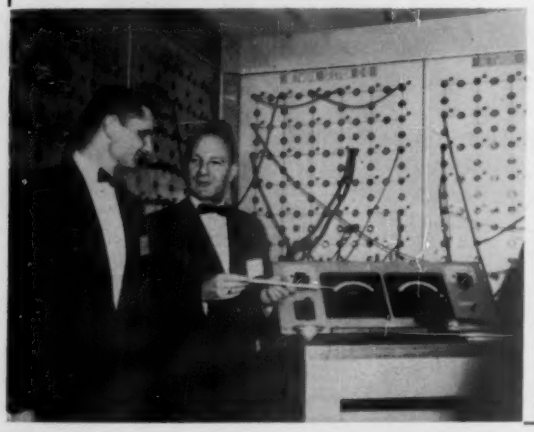
Thirty-four graduate fellowships in the fields of engineering, the physical sciences, industrial management, arts and science, business and graduate law have been awarded by the General Electric Educational and Charitable Fund for the 1958-1959 academic year.

Kenneth G. Patrick, secretary of the Fund, announced that the winners were selected by a committee whose members included representatives from outstanding educational societies and institutions.

These fellowships are part of a program which currently offers a total of eighty-eight graduate fellowships annually and were established to honor three former presidents and one chairman of the board of General Electric: Charles A. Coffin, E. W. Rice, Jr., Gerard Swope, and Owen D. Young. The Fellowship Program is one of several which comprise the Fund's over-all aid-to-education program which in 1958 will expend upward of one million dollars for educational support. Approximately another half million dollars in support for higher education is provided directly from Company funds.

The thirty-four fellows will receive stipends ranging from $1750 to $2500 a year, depending on their marital status and dependents. Tuition and fees will also be paid. In addition, an unrestricted grant of $1000 will be made to the institution where each of the recipients is studying.

Mechanical Brain Gift for Tufts



"Sputnik is quite a scientific achievement," says Worcester Division Manager Wood (right) to Framingham Division Manager Donald Story of the Worcester (Mass.) Gas Light Company, "but it takes nothing away from the mechanical brain of the gas industry." Both attended the dedication of the McIlroy Fluid Network Analyzer, presented to Tufts University by 17 Mass. Gas companies.

Arizona Supreme Court Rules on Registration Cases

A non-registered person who actually prepares drawings and designates materials and elements of construction for a building, although not representing or holding himself out as an "Architect" or "Engineer," is nevertheless unlawfully engaged in the practice of architecture or engineering, and as such subject to prosecution under the Arizona Registration Act. The unlawful nature of such practice is not lessened because of the fact that he did not "design, represent, sell, or contribute any service with respect to the soundness or safety" of the building.

These rulings were one of several questions of law relative to the Arizona Registration Act answered by the State Supreme Court prior to the actual trial of a person charged with practicing as an architect and as an engineer without registration, both in violation of the Arizona law.

In the course of its opinion, the Court ruled that fraud or misrepresentation (the actual representing or holding oneself out as a registered architect or engineer) are not essential elements of the offense of practicing without a license, and that the provisions of the Arizona statute imposing penal sanctions against the practice of architecture or engineering by non-registered persons are not unconstitutional on the ground of being vague, indefinite and uncertain.

With regard to the absence of a safety guarantee by the defendant, the Court stated that "a person who designs buildings cannot escape the necessary responsibility therefor by merely declining to assure the safety of the structure when it is constructed according to his plans. He is practicing architecture and as such must be registered."

On the question of whether the Act was a constitutional exercise of the State's police power, the Court noted that since design is connected with public health, welfare and safety, and as such is subject to regulation under the State's police power, it necessarily follows that persons performing such engineering and architectural design services are themselves subject to regulation.

And finally, the Court held that the Arizona Act is not unconstitutional on the ground that it constitutes an unlawful delegation of legislative power to an administrative board. *(Arizona* v. *Beadie.)*

Misconduct Charge Is Upheld

A charge of professional misconduct initiated against a registered structural engineer by the Arizona Board, in that the placement of his seal on architectural plans constituted aiding and abetting an unregistered person to evade the registration law, was upheld as valid by the State Supreme Court.

The Court based this conclusion on the fact that the statute is definite enough in its proscription of the type of misconduct alleged, and that it is sufficiently clear in its definition of "Architect" and "Engineer" so that a registrant could determine when he is practicing one or the other of the professions, or aiding or abetting another to evade registration.

Although the engineer claimed that the Arizona Act, regulating architects and engineers with similar definitions of each, did not give him a comprehensible notion of what he could or could not lawfully do in his profession, the Court stated that "It appears to us the plain import of the entire Act is that an engineer places his seal on engineering plans, and an architect places his seal on architectural plans. While the two professions are in some respect similar, they are distinguishable professions, each dependent on similar but quite distinct principles."

Two other charges, misuse of the seal and practicing architecture, were dismissed by the Court as not being sufficiently clear and complete to confer jurisdiction on the Board. Agreeing with the engineer that the provisions of the statute upon which the Board relied to support these two charges were so vague and indefinite that they failed to comprise adequate notice to him of the misconduct with which he was charged, the Court concluded that the language was such that the engineer could not possibly have violated the provisions in question. The first, pertaining to the issuance of a seal, was merely a directive to the Board, and said nothing about use or misuse of such seal by engineering registrants, the Court said.

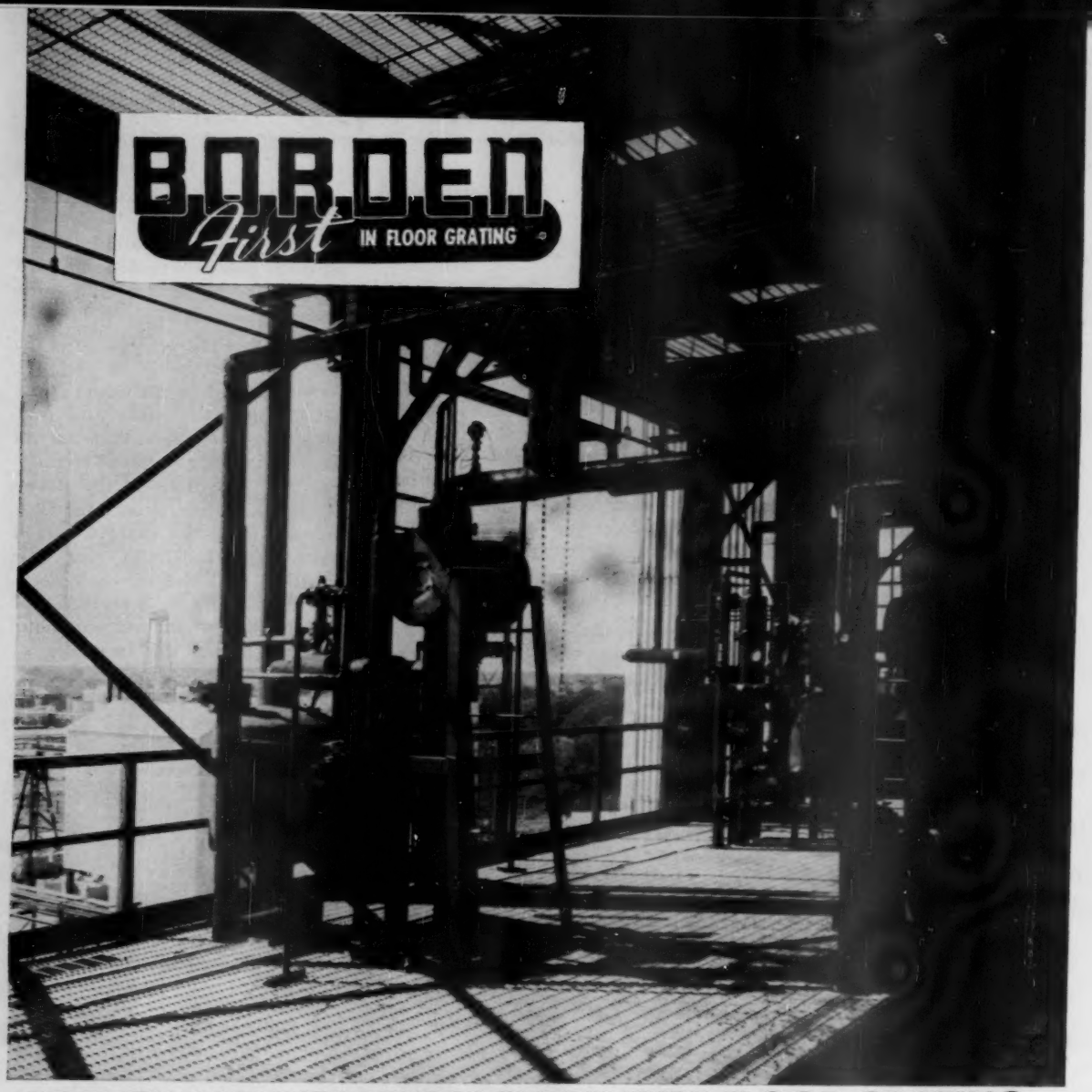
The second section of the statute, relied on by the Board, defined "architectural practice" and was held by the Court to be nothing more than a definition, and as such, insufficient to support the alleged misconduct charge of "practicing architecture." *(Board* v. *McDaniel.)*

Court Holds Architect Must Take Exam

The Arizona Board's refusal to register an architect without a qualifying examination was held not to be an abuse of its discretionary authority to pass upon the qualifications of applicants for registration.

The case arose when an applicant for registration as an architect was notified by the Board that he was "to be held for a written examination in architecture." He refused, however, to take the examination, claiming that the credentials submitted by him fully met the statutory requirements for registration, *i.e.*, he was entitled to a waiver of examination upon his record "of having engaged in ar-

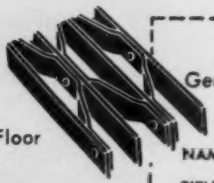
(Continued on page 37)



BORDEN MANUFACTURES EVERY TYPE FLOOR GRATING

IN FERROUS AND NON-FERROUS METALS

- **EASY TO INSTALL** — engineered in conveniently sized units for easy installation.
- **EXTRA STRONG** — reinforced, designed with maximum safety factor.
- **LIGHT WEIGHT** — approximately 80% open, reduces dead weight, allows greater live load.
- **SELF-CLEANING** — creates greater safety, economy of maintenance, no sweeping or washing required.



Write for complete information on BORDEN All/Weld, Pressure Locked, and Riveted Floor Gratings in this FREE 8-page catalog

BORDEN METAL PRODUCTS CO.

953 GREEN LANE ELizabeth 2-6410 ELIZABETH, N. J.

Plants at: UNION, N. J.; LEEDS, ALA.; CONROE, TEX.; BEETON, ONT.

BORDEN METAL PRODUCTS CO.

Gentlemen:

Please send me BORDEN Catalog

NAME .....

TITLE .....

COMPANY NAME .....

ST. AND NO. .....

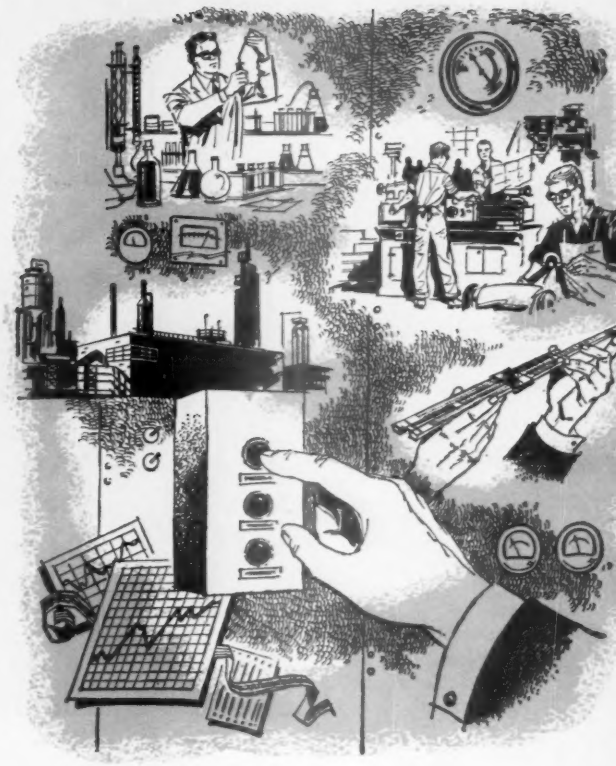
CITY AND STATE .....

(Circle 7 on Readers' Service Card)

American Engineer

The Engineer at Work

Automation Comes to the Chem Lab



By

STANLEY P. DODD

Technical Director, Chicago Apparatus Co.

WHEN two engineers get together these days, the one subject they're almost sure to discuss is automation.

What will it mean to them personally?

What will it mean to the engineering profession?

What will it mean to the American economy and our way of life?

Engineers can speculate to their heart's desire, but these questions can't be answered positively and definitely on the basis of experience to date. Not that automation, strictly speaking, is new—the chemical industry, for example, has been progressively automating for years—but the changes and improvements have been so gradual that it's difficult to gather facts about "before and after" situations.

Engineers are great for facts, of course. And in the area of automation, they should soon have a chance to gather facts on what happens when complicated, pains-demanding operations are automated abruptly, rather than by slow steps. The study will be made possible by the introduction in this country of equipment which automates quantitative chemical analyses. Not simple, one-step analysis, detailed ones that heretofore have demanded the presence (and sometimes the pre-science) of a human chemist.

Called the Analmatic, this equipment is made in England by the firm of Baird & Tatlock Ltd. Many instrument systems, similar to the ones that will be available in this country, are now in use in British industries, and thus we have a good amount of experience to draw on.

Analmatic equipment consists of packaged units which continuously perform all the operations of a given analysis. It starts with sampling, goes through the steps of mixing the sample with reagents and performing a standard measurement such as colorimetric or pH, and then records results. Human assistance can be limited to replenishing reagents used in the analysis.

If desired, control circuits can be included to form a completely automated circuit for production control. The Analmatic serves as a complex sensing element, in analogy to the electrode pair in a pH control loop.

We don't want to bog down in technical talk. But this brief description only hints at the potential importance of the Analmatic, the impact it should have on chemical engineering. Look at it this way:

For the first time, analytical procedures involving "wet" chemistry are being automated and a sector of production control which has belonged to man alone is being taken over by man's mechanical instruments.

PRIOR to Chicago Apparatus' decision to import these instrument systems, I was assigned to study their use in Great Britain. I had the chance to make many interesting first hand observations of automation in the chemical laboratory.

From the experience in England, we have a good idea of the industrial conditions under which Analmatic instruments will find their greatest potential use. Since the first requirement of an automated system is that it produce a clear-cut, demonstrable economy, Analmatic has been quickly accepted in places where there is a requirement that control analysis be carried on continuously. Second, the product to be analyzed should be of sufficient value that increased efficiency will be meaningful, either in terms of reduc-

The author warns that claims of manpower savings through automation are often made on extremely doubtful grounds.

tion of waste and spoilage, of by-product recovery, or similar situation.

One particular example, proving both these points, is a plant manufacturing ethylene glycol antifreeze. Analmatic equipment continuously checks waste liquid to make sure that the manufacturer isn't throwing away quantities of antifreeze that could be recovered economically. Automation here has been not only feasible but very economical.

In a similar situation, the British Atomic Energy Authority is using Analmatic equipment to analyze the uranium content of refinery streams. In fact, the first Analmatic system was built for this use and the Authority has learned that its three "Mark II Analmatics" can do the work of eighteen analytical chemists.

Will this saving be duplicated in any American industry? We don't know, frankly, and we feel that claims about manpower savings often are made on extremely doubtful grounds. We would rather rest our case on the other major advantages of laboratory automation.

Probably the most important is the close control of product quality. To check this statement, consider the way that laboratory analysis and production control are linked inseparably in many industries. The plant engineer who can get analytical data sooner, at more frequent intervals and assured accuracy will see a new road to lower costs and increased yields.

There is plenty of evidence, also, that the sample-to-result route of the typical analysis needs to be shortened. There now are many stratagems aimed at this goal: pneumatic conveyors for sending samples from the production stream to the laboratory, continuously open intercommunication lines, analytical "teams" in which each member specializes in one step of the analysis, and many others.

And what do these add up to? It is apparent that any scheme involving humans can't be as unfailing and invariable as automation.

Information that is obtained by instruments not only will be "fresher," but we have good evidence from another English use that it will be more accurate than that produced by human analysis.

INDEED, there was one startling comparison of automation and human skills in one application in England. Laboratory personnel were asked to pipette series of identical samples, which were then analyzed in the automation instrument. Straying attention, conversations with colleagues and other failings and distractions have all shown up clearly. They contrast sharply with the unvarying results obtained with samples drawn automatically.

A second major result of automated analysis should be the increased use of laboratory personnel for creative work such as the development of methods. Quite frankly, it is more than commonplace to talk about automation in terms of "freeing human beings for creative work." In many cases, the statement may not have believability. But both chemists and laboratory technicians are in short supply today, and there is many an instance of a competent analyst devoting most of his working time to routine analysis. In addi-

tion, automation can lighten the burden on laboratory facilities.

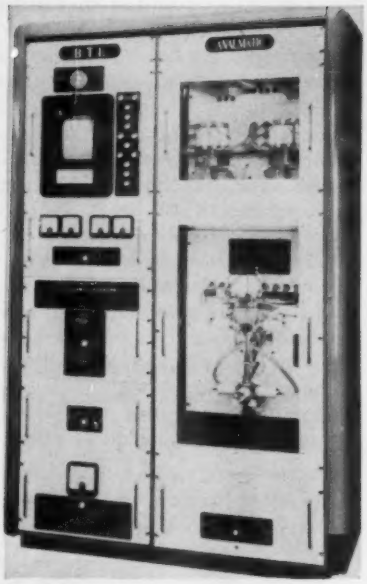
Now, what about the question of maintenance? In common with all automated equipment, Analmatic assemblies bring with them a maintenance requirement which is usually assigned to the plant instrument department. And because of the critical applications involved, maintenance is a heavy responsibility.

The attention of a competent and experienced instrument specialist is advisable any time complex circuitry is employed. However, breakdowns of the Analmatic are kept to a minimum because components and construction must meet such a high standard. It is a true process control instrument, not an item of laboratory apparatus.

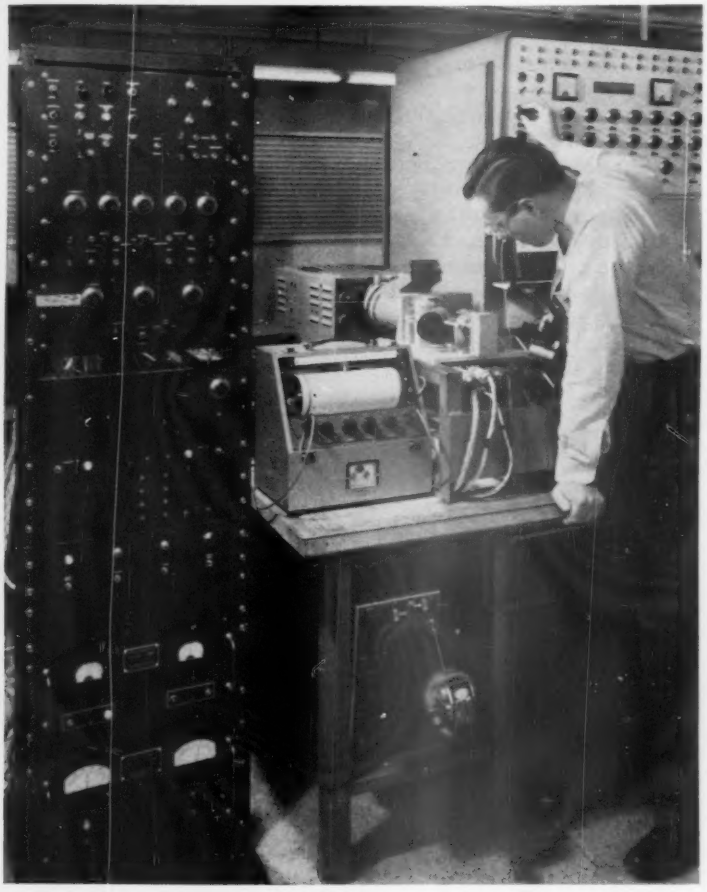
In addition, downtime for malfunctions will be held to a minimum because the Analmatic has a search circuit which quickly indicates the source of trouble.

Thus, in accordance with the maxim that one man's meat is another man's poison, we find that automation relieves one department, the chemical laboratory, and increases the load in another, the instrument shop.

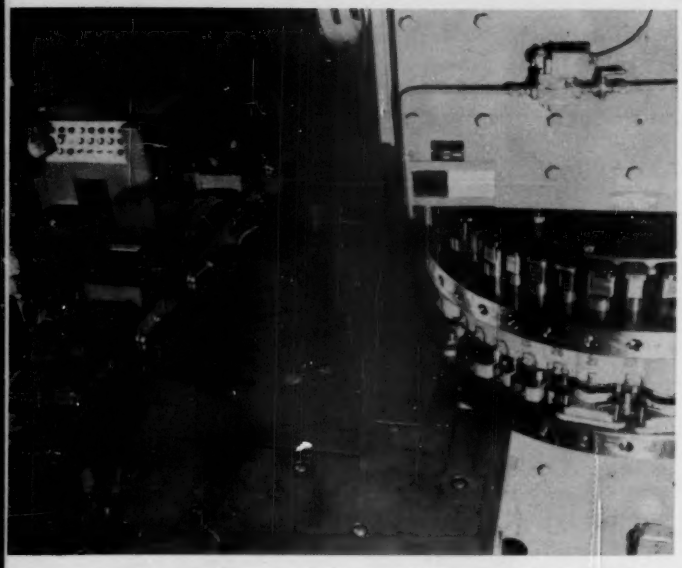
What about the future of quality control through laboratory automation? That is the important question. On the basis of experience to date, we can make some logical predictions—even while admitting that



The Baird & Tatlock Analmatic uranium analyzer, above, introduced in the U. S. at the National Chemical Exposition Sept. 9-12, is capable of going through as many as twenty steps in analyzing complex chemicals and recording its findings. The first model of this instrument is used at a uranium processing plant to monitor sixteen different points along the production stream. This and other Analmatic instruments are being distributed in this country by Chicago Apparatus Company.



The professional engineer of tomorrow can look to automation to present many challenging and interesting problems.



Automation will be applied more and more to checking, classification of raw materials, through all phases of the processing, to the final inspection of the finished product.

any look into the future of as rapidly changing a field is open to a great deal of question.

In industry, we can expect to find rapidly increasing quality control automation in large volume, high value operations. It will be applied to checking, classification and handling of incoming raw materials, through all phases of the processing, to the final inspection of the finished product. On the other hand, short run or small volume production will not justify the cost of automation except in the case of the unusually high valued commodity.

As the degree of automation increases, there will be increasing use of specialized computers to coordinate data that has been supplied by analyzers, applying the data to the production process. The resultant close control will permit a high rate of output with reduced waste and better product quality.

ULTIMATELY, this means lower prices to the consumer. New plants will have the benefits of automation at a relatively low cost.

Now, to the human equation. It appears now that progressive automation will not produce any painful human problems, even for the short term. Technical and skilled people relieved by new equipment are in relatively short supply. The need for such people seems to be increasing every day, as our technology becomes more complex.

As more automation units are demanded by American industry, there will be an obvious need for engineering knowledge and technical skills to develop and build the varied assemblies. In effect, many engineers will be employed to build instruments which will perform some routine jobs which now come under the engineer's supervision.

Of course, this presupposes that American companies will get into the manufacture of laboratory automation equipment. The Analmatic itself, in our observation, could not be duplicated in this country at an economical price. So much design engineering and hand craftsmanship is involved, and these are the typical skills at which the British excel. Americans usually do their best in mass production situations. When demand for automatic laboratory equipment reaches the mass market stage, Americans will step in.

Back to the effects of automation on the engineer, maintenance will increase to the point where a formal instrument service department will be found in every plant with very much automated equipment. These departments must be staffed with a "new breed," personnel who have special training in industrial instrumentation. It is typical of the many new skills for which a demand is being created today.

In a broad sense, automation will enrich the material side of our lives by making better products available at lower prices. It will demand of us, on the other hand, that, on the average, we improve our capacity for creative thinking, the function which seems to be still uniquely ours.—**End.**

As many as 250 samples an hour can be handled by a single operator with this semi-automatic assembly for making rapid colorimetric measurements. The operator need only place the sample test tube in the entrance receptacle. It is then pumped to a colorimeter cell where its transmittance is measured and the result recorded on a strip chart. The sample is then returned to the test tube, whereupon a signal lamp indicates the instrument is ready for another test.

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

RANDOM OBSERVATIONS ON A HECTIC LEGISLATIVE YEAR

IT is the custom in most walks of life to pause and take stock before plunging ahead into the swirls and eddies of an uncertain future. So we have year-end reviews of the business and economic picture, annual reports of corporations and associations, and learned analyses by the legislative leaders at the close of a Federal or state legislative session. As in past years, NSPE has published a summary Legislative Bulletin which is being sent to the full membership so it may be informed of the Society's program, interests, accomplishments and defeats. Fortunately, there are none in the latter category this year, but it will be noted that there were some "near misses," and several items which will have to be fought out again.

One factor which stands out in this "stock-taking," is the very high degree of NSPE legislative activity and the heavy reliance placed upon supporting action at the local level and through individual members. Particularly during the closing days of the 1958 sessions, the pace of grass roots contact grew intense and, at times, almost frenzied.

NSPE Legislative Committee Chairman Robert F. Miller termed the response to the calls for local action, "nothing less than magnificent." Miller, in his report to be presented to the Board of Directors at San Francisco, later this month, said "success in our legislative program is dependent to a very large degree upon the cooperation and assistance of the state societies, chapters and individual members. To be successful in political-legislative affairs we must be realists, and the realism is that a legislator is influenced by what his constituents think of a given proposition. Therefore, we have a two-way responsibility. The Legislative Committee, with the aid of other committees expert in particular subjects, and the Washington office of NSPE, must spot the legislation of interest to the engineering profession, pinpoint that portion of it which is of direct concern, relate that interest to existing policy, or set the wheels in motion to develop policy (and sometime this must be done very rapidly) and then advise the appropriate committees of Congress of our position and recommendations. But this is not enough—then comes the follow-through which is all important. There are several aspects to the follow-through, but the most vital, and the one we cannot succeed without, is local action and support." Miller told the Board that the Society had reached a high point in its reliance upon local supporting action and briefed the Board on the legislation involved.

In the fashion of popular evaluation systems, the following five legislative items in which NSPE concentrated much of its effort are characterized in terms of past congressional attention and prospects for the future.

OF MOST LONG RANGE IMPORTANCE—The deliberative legislative system operated at its best in the orderly development of the Federal Aid To Education bill. From the beginning, this was an "engineering-science" bill in emphasis, although its coverage was never restricted to technical education. For NSPE, and others of the same opinion, the major significance was over the question of undergraduate scholarships, or, as NSPE put it in testimony, whether the emphasis should be on quality or quantity. The elimination of scholarships in the final version thus was a major victory for those who wanted to emphasize quality.

But this fight is not over. The newly-appointed Secretary of Health, Education and Welfare, Arthur S. Flemming, has already indicated he may ask the next Congress to reinstate scholarships in the education program. Flemming said that while he approved of the student loan provisions in the final bill, this "won't bring in the type of competitive student that the scholarship program would have brought in." How far Flemming may go in this direction depends on some unknown variables at the moment—how the President may feel about waging another fight for scholarships in view of his decisive defeat on this point, and the degree to which changes in the membership of Congress may change the overwhelming sentiment of 1958 against scholarships.

MOST DIFFICULT—It is frustrating to have to deal with a definite and specific point in the context of a comprehensive bill which, as a whole, is highly debatable and subject to strong pressures. The single point, while significant, is often lost in the larger fight. To an extent this was the case in connection with

Mr. Mitchell

Mr. Flemming

Mr. Vogt

Mr. Miller

NSPE's efforts to amend the TVA Revenue Bond bill so as to prevent TVA from offering or providing engineering services to non-TVA and non-Federal interests. At no point in the proceedings did anyone particularly oppose NSPE's stand, but it is doubtful that the members of the committees were particularly aware of this point of significance to the engineering profession while caught in a cross-fire of charges and counter-charges from friends and enemies of TVA. A second unfortunate aspect of this type of position is that both sides in the larger fight are prone to assume identification with the larger over-all question. As it turned out, the question remained unresolved when the House Rules Committee refused to let the bill go to the floor. This means the fight must be gone over again next session, NSPE will have to again urge its point and suggest the deletion of the offending language. Whether this can be achieved will depend in large measure upon the educational efforts of the National Society and the local and state levels.

MOST GRATIFYING PROGRESS—The House passage of the Jenkins-Keogh bill to permit a limited tax deferment for the self-employed for retirement purposes has been termed a "minor miracle," by Robert C. Vogt, P.E., NSPE representative to the American Thrift Assembly, in a progress report to consulting engineers. Vogt's statement was justified in the light of an unusual agreement between the Republican and Democratic leadership that no tax relief legislation would be permitted. In effect, this agreement threw about one thousand tax bills into the wastebasket. Yet the Jenkins-Keogh measure did pass the House by an overwhelming vote. It failed to pass the Senate largely because time ran out, and even then it mustered thirty-two votes on a parliamentary question of whether it should be considered as an amendment to a technical tax revision bill, and this in the face of combined opposition of the majority and minority legislative leaders. With this background, Vogt was able to report to the self-employed consulting engineers that the outlook is favorable for success next year.

MOST EXCITING — The Federal employees' pay raise legislation developed slowly and in the usual fashion, but as it picked up steam one of the central issues came down to the pros and cons of granting engineers and scientists the full ten per cent increase, no increase, or something in between. This issue became so critical, that at one point it was considered possible that the whole bill could be killed off. Basically, the argument centered about charges of favoritism for engineers and scientists by the "equality" school of thought in government personnel circles. It will be recalled that engineers and scientists had been pushed to the top step of their grade as an aid in their recruitment by the Federal agencies. The "equality" school wanted to restore the doctrine of "internal alignment." So the battle raged until the last possible moment. NSPE was in the thick of it, with phone calls flooding in from Federal engineers and scientists from all parts of the country, now looking to the Society to save the day. When it was all over the conferees decided to give the engineers and scientists the full increase, and with this last obstacle settled the bill sailed through both houses in final form. The basic question remains to be settled, however, as the Civil Service Commission has sought to reduce the advantage of engineers and scientists by rescinding the "top-of-the-grade" order for newly-hired and promoted employees.

MOST MISUNDERSTOOD — Immediately following the close of Congress, the favorite Washington political sport became an exchange of insults and accusations over who was responsible for killing the bill to deal with labor union abuses exposed by the McClellan investigating committee. Secretary of Labor Mitchell said it was all the fault of the House Democratic leadership for not letting the Kennedy-Ives bill, as passed by the Senate, go to the House Labor Committee for normal processing and report. Senator Kennedy retorted that it was the fault of Secretary Mitchell and the Administration for not being willing to accept the Kennedy-Ives bill as better than nothing. This poses a neat question—is it better to accept a bill with some good provisions at the expense of "riders" which are objectionable to many and which deal with substantive labor policies having no relationship to reform legislation? This was really why the reform bill was killed. It was legislation based on political expediency, but "sold" exclusively as a "reform" bill. No better illustration of the point is to be found than in the provision which aroused NSPE activity—an attempt to slip through a procedure for the construction industry which would have taken away the separate voting rights of professional employees.

New Literature

PROBLEMS PIPING – How to handle thermal expansion and contraction in piping with Barco Ball Joints is outlined in a new 6-page bulletin published by Barco Manufacturing Company, maker of flexible ball swing, swivel, revolving, and other types of movable joints. Illustrations of the four basic motion principles of Barco Ball Joints provide the key to the various examples of how to provide safe flexibility in service lines subject to severe contraction and expansion. Actual installations are also shown and explained. Comparison data with other methods of expansion-construction control is given. Design engineers as well as operating engineers will find this new bulletin of particular interest. Copies are available from Barco Manufacturing Co., Department AE, 501 Hough St., Barrington, Ill. Ask for Bulletin No. 31.

(Circle 15 on Readers' Service Card)

FILES—An illustrated brochure recently produced by Momar Industries, Chicago, presents the company's line of Glider Blue Print Files. It explains the "glide-action" filing and withdrawal of standard 100-sheet clamp-type plan holders. Four basic rack-types are presented, with extensions for the largest unit. Result is a modern method of filing and retaining blue prints, maps, charts, art work and other plans for more operational efficiency, longer sheet use at less cost.

(Circle 16 on Readers' Service Card)

EQUIPMENT—The Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis., has published a 12-page bulletin, No. 2250, on "High Frequency Equipment." This bulletin points out the value of high frequency equipment as a means of increasing the output or efficiency of present-day high production machinery that is often limited by standard 60-cycle power. It also stresses that drivemotors operating at above-line frequencies can be built smaller, lighter and are often less expensive than standard drivemotors. Application and engineering information is given on two types of high frequency power supplies: Induction Frequency Converters for use where 80 to 400 cycles per second are needed, and Motor-Alternators for operations requiring 400 to 3000 cps. The basic differences in these two high frequency sources are discussed and their capabilities for constant and adjustable speed are outlined.

(Circle 17 on Readers' Service Card)

RAM-PUMP SYSTEMS—Lincoln Engineering Company offers a bulletin on its new "Ram-Pump" Centralized Power Lubrication Systems. Fully illustrated, this 4-page bulletin features Lincoln pumping units for both low pressure and high pressure applications. The bulletin illustrates and describes applications and advantages of the Ram-Pumps, complete with photos and drawings of different types of instal-

lations. Also shown are descriptions, specifications and dimensions of lubricant injectors that are used with the new pumps, plus various controls and accessories for Lincoln Automated Centralized Systems including a selection of pressure switches, timing devices, three-way valves, and air line accessories. The bulletin points out that the new Ram-Pump Systems are specifically designed to "provide automatic or semi-automatic lubrication of bearings, simultaneously, on single machine units while in operation" and to assure "modern productive maintenance at lowest cost." Copies may be obtained by writing for Lincoln Bulletin No. 812, Lincoln Engineering Co., 5702-38 Natural Bridge Ave., St. Louis 20, Mo.

(Circle 18 on Readers' Service Card)

DRAFTING—In a special 8-page article entitled "More Engineering for Less Cost," Arthur H. Rau, consultant—drafting for the General Electric Company, Schenectady, N. Y., tells how good drafting programs achieve savings for both engineering and manufacturing. The illustrated article, reprinted by The Filmsort Company, Pearl River, N. Y., a division of Miehle-Gross-Dexter, Inc., spells out the importance of coordinating drafting between engineering and manufacturing; controlling engineering changes; standardizing engineering forms and procedures; using functional drafting, freehand drawing and arrowless dimensioning to save drafting time.

(Circle 19 on Readers' Service Card)

TESTING—Thirty-two new catalog items for soils, concrete and asphalt are described in a New Products Bulletin now available from Soiltest, Inc., manufacturer of engineering test apparatus. Included in this 4-page bulletin are descriptions of the Right-A-Weigh Balance, the Basic Concrete Tester, a new 200 ton Pile Loading Ram, a Concrete Air Indicator and Precision Air Entrainment Meters. Two books, Collin's *Landslides in Clay* and Hough's *Basic Soils Engineering* are listed as well as the Harvard Miniature Compaction Apparatus, the Brunton Pocket Transit, a new compact Cement Briquette Tester and a Recording Unconfined Compression Tester. A copy may be obtained by writing Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

(Circle 20 on Readers' Service Card)

MAINTENANCE – Thirty seconds daily suffices to put a battery on charge—the only daily maintenance job most users of electric industrial fork trucks will probably ever have—says one of a brace of new bulletins offered by Exide Industrial Division, The Electric Storage Battery Co., Philadelphia, Pa. And five minutes per month takes care of washing batteries, the bulletins note in supporting Exide's contention that industrial batteries are the most economical form of fork-truck motive power. Step-by-step photos and instructions in the two bulletins show the recommended sequence for carrying out each of these operations, and how easily they are performed in the stopwatch times cited. For a copy of Bulletins 5996 and 6207, write Exide Industrial Division, The Electric Storage Battery Co., P. O. Box 8109, Philadelphia, Pa.

(Circle 21 on Readers' Service Card)

APPLICATION BULLETIN—A bulletin announced by The Trane Company, believed to be the first of its kind, includes specialized application information for engineers on the firm's lines of heating equipment for high temperature, high pressure, hot water systems. Products covered in the unique bulletin are Trane Model HS Horizontal Unit Heaters, Model PS Projection Heaters and Torrivent Coils. Also included are complete capacity tables and charts, conversion factors for all size units, methods of calculating capacities over a wide range of conditions, coil selection data and recommended engineering specifications. For further information, write on your firm's letterhead to Trane, La Crosse, Wis., for Bulletin D-327-2.

(Circle 22 on Readers' Service Card)

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in this column, merely circle the item number on the Readers' Service Card and mail to AMERICAN ENGINEER.

Solving of Technical Problems Makes Possible Our

RADAR DEFENSE SYSTEM

A NINE-YEAR, $18,000,000,000 construction project has girded the forehead of the New World with a monumental headband of prefabricated materials. This is the wondrously intricate radar defense system, its width hemmed at the polar icecap and the Mexican border; radar networks within networks, electronically linked to the Ent AFB nerve center at Colorado Springs.

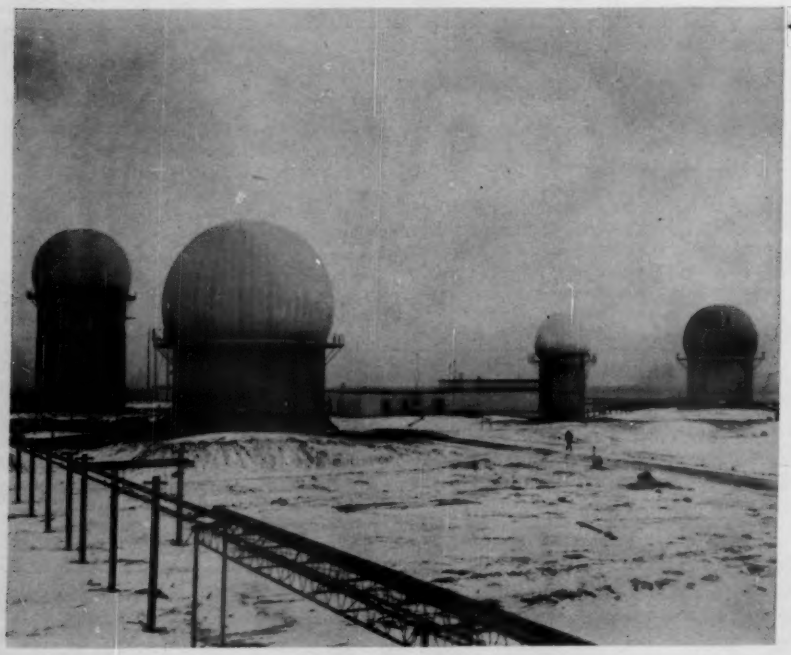
Mainstay of the headband—from the standpoint of materiel deployment and construction—are the two northernmost lines of radar stations. One is the 9,000-mile DEW (Distant Early Warning) band across the Arctic, with its sea extensions of relays of radar-equipped destroyer escorts and WV-2 Super Constellation airborne picket stations, from the Aleutians to mid-Pacific and from Newfoundland to mid-Atlantic. The other is the double-line "Pinetree System," spanning Central Canada 600 miles south of the DEW line—with flank extensions of picket ships, RC-121 Super Constellations and ZPG-ZW blimps.

Just completed is the $600,000,000, three-thousand-mile Arctic portion of the DEW line—more than fifty radar stations from Cape Lisburne, Alaska, to Baffin Island, Canada. Right now, some 600 Americans and Canadians (ninety-eight per cent of them civilian engineers and technicians) who man these DEW stations—watching luminescent oscilloscopes in darkened, even-temperatured rooms around the clock—are "relaxing" after having dug out from their first winter of blizzard and long night.

Completion of the basic DEW Line thus marks reality of one of man's greatest engineering undertakings. No longer do piles of ice and stone solely dominate Arctic barrens. Man and his machines have spent their first winter there, in warm metal-rubber-and-plastic "piles." Tropospheric antennae stand longside nature's spires and provide over-horizon communication among all far-flung man-made stations. Man has made his bid for domination through industry.

This headband is basically American-built of American materials; American design, engineering, fabrication and manpower.

Much of the construction, equipment and specifications involved in creating these land and offshore radar stations remains classified. It can be reported, however, that basic design and fabrication of the radar towers was done by the Dres-



Radar towers "somewhere" in Arctic Alaska guard the nation against surprise attack.

"Texas Towers" 110 miles off the New England coast. Center tower contains plastic sandwich panels, holding radar beneath black, 55-foot rubberized radome.

ser-Ideco Company of Columbus, Ohio, incorporating in their superstructures vital special insulating panels manufactured by the Haskelite Manufacturing Corporation, of Grand Rapids, Mich., a subsidiary of the Evans Products Company, of Plymouth, Mich.

Behind-scenes, it was involved engineering research and testing of a wide variety of materials that solved a "missing-link" problem:

When Dresser-Ideco contracted with the Government for design and fabrication of these radar stations—steel superstructures with insulated, galvanized metal skins (see photos)—a major need was for some type of special deck or platform for the top of the towers, that area beneath the 55-ft.-high rubberized protective radome where revolving radar gear would be mounted.

"We found what we sought in 1951," Dresser-Ideco Engineering reports, "when Haskelite developed these special insulating panels for us. They are of laminated construction, consisting of an outer skin of 20-gauge galvanized steel, then a layer of quarter-inch plywood of exterior marine grade, a center core of expanded rigid rubber insulation, then another layer of quarter-inch plywood and an outside facing of 20-gauge galvanized sheet metal.

"They're custom-built to withstand the fierce Arctic elements."

Plant tests must assure that the panels meet these specifications: They must support a working load of 100 pounds per square foot across a four-foot span, with virtually no deflection and without plastic adhesive flow during ten days in ambient temperatures of 65° F. to plus 160° F. Panels must have a heat-transfer coefficient of less than .20 BTU per hour per square foot per degree F. Joints must be air- and water-tight under pressure.

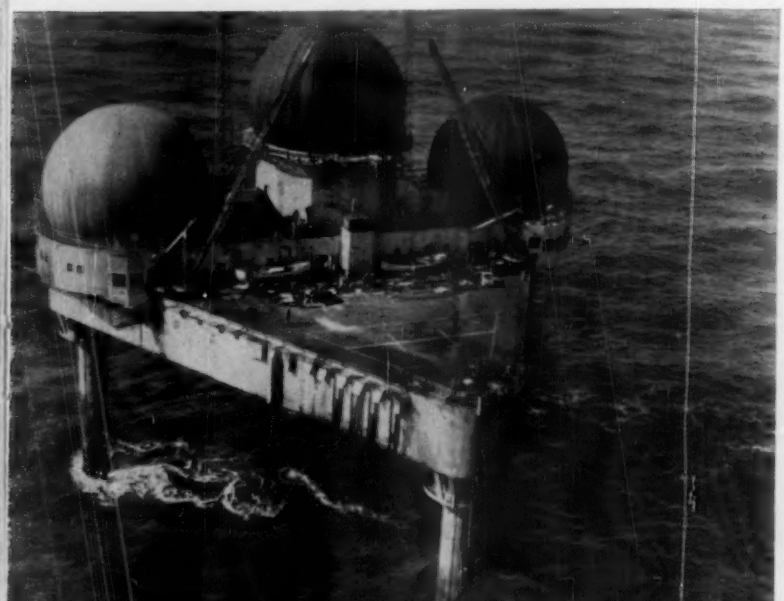
"These panels must be able to withstand thirty-six months' outdoor storage and still meet these specifications" Dresser-Ideco says. "Regarding the load tests, when the panels are in use as radar tower platforms in the Arctic half, the panel load is due to air pressure and the other half is live load from personnel and equipment." (One of Haskelite's in-plant load tests involves a 150-pound man jumping up and down on the panels as they lay across a four-foot gap.)

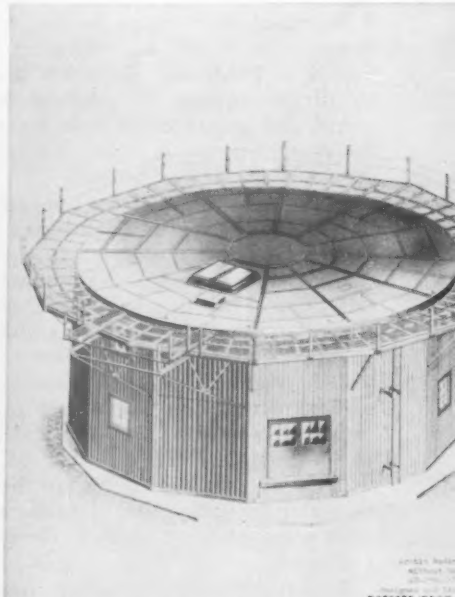
A completed DEW station includes antenna masts, garages, insulated Atwell shelters for person-

(Continued on Page 37)

A close-up view of the artic radar tower with radome.

Here is the radar tower before the radome is put into place.





The scene is the 1958 annual meeting luncheon of the Kansas Engineering Society with NSPE national officers present at the front table. The Kansas Consulting Engineers' Functional Section had just completed its morning meeting.

Kansas Consultants Test State Society Functional Section

By

DONALD P. SCHNACKE, P.E.

Secretary-Manager, Kansas Consulting Engineers' Functional Section

KANSAS consulting engineers have participated in the last several years in bringing about a strong unified engineering society within the State of Kansas. Out of this has arisen an active Functional Section of Consulting Engineers that emphasizes and coordinates matters peculiar to the private practitioner, and continues to serve as an integral part of the State Society. A brief description of how this developed should be discussed.

In 1954, there existed two state engineering societies in Kansas. The Kansas Engineering Society, organized in 1915 as a society devoted to the "advancement of engineering knowledge and practice" and carried out this purpose by presenting and discussing technical papers at the annual meetings and the collecting of books, maps, plans, and exhibits to further its work; and the Kansas Society of Professional Engineers, organized twenty-nine years later in 1944 which had in addition to what its sister and old society has as its purpose, the advancement of the professional, social, and economic interests of the professional engineer and the cultivation of public appreciation of his work with attention given to the ethical standards of engineers.

Kansas engineers obviously were involved in two societies that fundamentally stood for about the same thing. Recognizing the detrimental effect on the future of the two societies, each holding the other from becoming the voice of all the state's engineers, they agreed to consolidate and merge the two together; and the resultant society became, in 1954, the now functioning Kansas Engineering Society, bringing together for its purposes those elements of the two merged societies that promote and advance the status of engineers in general while protecting and developing the welfare and interests of the public through its efforts, de-emphasizing the technical advancement and importantly, allowed for the creation of technical sections.

Two provisions, which make this discussion possible, appear in the Constitution and Bylaws of the new Kansas Engineering Society which provide for it to be a member state society of the National Society of Professional Engineers, and allow the Board of Directors to establish functional sections along technical lines or by type of professional employment.

The consulting engineers, during the 1955-56 period, following the merger of the societies were busy practicing their professions and many firms were involved in designing the Kansas Turnpike, a 236 mile modern toll road running from Kansas City, via Wichita to the Oklahoma State Line. The first need for a combined effort of consultants became apparent during this period, when many of the firms found they had common problems in negotiating with the Turnpike Authority and others involved in the project regarding terms of payments, services required, and in one case where a firm was allegedly involved with the Federal Wage-Hour Law. Out of this mutual understanding of problems came a general feeling that there was a need for a section of consulting engineers to be formed to work on many of the problems facing

consultants and firms that could not possibly be accomplished singly. Also at about the time of the annual meeting of the Society, there appeared in the January, 1956, issue of the AMERICAN ENGINEER information concerning the formation of functional sections in the State of Ohio. The Kansas Society was ripe for the formation of its first functional section and the Consulting Engineers' Section was created November 9, 1956.

It wasn't so simple, however, in deciding how the group should be organized. The State Society had a place for the Consulting Engineers' Section, but many were not yet convinced that this was the proper course. Many felt that an independent organization or affiliation with the Consulting Engineers' Council was the proper way to turn. The majority felt, however, that to organize outside the State Society was to recommit one of the old sins of the engineering profession—too many organizations—and that if affiliation with the State Society could work, this would be the better way and avoid a new splinter in the family of engineering societies. The final decision came to form a functional section within the Kansas Engineering Society and in this writer's opinion, from observing the everyday growth of the Section since it undertook a full-time schedule, it was a wise decision. The strength of the Section actually lies within the strength of the State Society. The number of members and the prestige of forty-three years of organized society work gives the Section's every move considerably more significance than if it was operating as a separate entity. Negotiating matters before State boards, legislative committees, governmental officials, and other groups which affect the consulting engineers' welfare, carry with it far greater significance with the entire Society's backing.

The State Society seldom influences the Section's work. Only on matters of general policy or where the Society's name will be used generally, such as in public news releases, etc. In these cases, the Executive Committee of the Society is informed what is planned, and excellent cooperation has been received. It is satisfying to know that the State Society as well as the National Society are behind the Section's every move.

Organizing a functional section is one thing and making it work is still another. The consulting engineers looked at their newly created Section and decided that in order to make it work at its best, something had to be done about eliminating the standard procedure of waiting on committees to act and for an annual meeting to hear their reports. The solution sponsored was to have those individuals and firms interested contribute to an assessment plan to maintain a full-time office and secretary-manager. It is worthy of mention that at the meeting for organizing the budget and to obtain the necessary pledges for participation, promissory note forms with pertinent statements concerning the participation of the firms were offered with the request that each one should contribute $100 in advance as a minimum contribution to be credited at a later date. Some thirty-eight firms signed up, insuring the initial year's budget of about $18,000; and the basis for hiring full-time employees to carry out the program was established. This was pioneering a new first for functional section work within the organizational framework of the National Society.

The membership of the Section has two classes: (1) Sustaining members and (2) Members. The former are the ones that pledge to participate fully in the assessment schedule established and the latter become members by paying the nominal annual dues. The sustaining members are, of course, the ones who are responsible for annual revenues of the Section; and without them, the many activities could not be sponsored. The assessment is based upon the size of the firm participating. The smaller firms may never pay in more than the initial $100 minimum heretofore discussed, and a large firm of some 150 employees may pay as much as $4,000 annually. The assessment schedule now in force is as follows:

1st 5,000 hours	$0.04/hr.
Next 10,000 hours	0.03/hr.
Next 25,000 hours	0.02/hr.
Next 60,000 hours	0.015/hr.
Over 100,000 hours	0.01/hr.

By adding 2,000 hours for each partner less one to the calculated total man-hours of the firm, which includes all employees regardless of their position, and

The 1958 Consulting Engineers' Section's Executive Committee calls for a huddle to plan future strategy and receive instructions from its chairman, Murray A. Wilson (back to camera), at the Kansas Engineering Society's 1958 annual meeting.

by applying the above schedule, the resulting calculation is as fair a determination of assessing the general membership that had been proposed. This is the schedule followed in Kansas.

Out-of-state firms doing business in Kansas are invited to become members of the Kansas Section on the theory that whatever the Section does is beneficial to them. These firms contribute to the general revenues on the basis of pro-rated man-hours of the work performed in the State of Kansas. The interest from these firms has been high and their contribution to the organization outstanding.

The organization of the Section consists of: chairman, Murray A. Wilson, Wilson & Company of Salina; secretary-treasurer, William F. Ryan, Ryan Engineering Company of Salina, who is also one of the national directors of NSPE; and the vice chairmen are L. M. Van Doren, Servis, Van Doren & Hazard of Topeka; O. O. Ediger, Ediger & Company of Wichita; Ervin E. Hysom of his own firm of Wichita; Raymond W. Campbell of his own firm of Merriam, and Dale V. Davis, Davis & Razak of Dodge City. This group comprises this current year's Executive Committee and has the responsibility of establishing policies for the Section between annual meetings and coordinating the secretary-manager in his work with others in the Section. The latter four above named persons serve as chairmen of the Section's Committees: Public Relations (Legislation), Professional Relations, Fees and Salaries, and Ethics and Grievances. To demonstrate the closeness of the Section's working relationship with the State Society, Vice Chairman L. M. Van Doren serves a dual roll of chairman of the Committee on Ethical Practices for the State Society. In many cases to date, this has been very convenient as it avoids overlaps and duplication of effort.

THE test of the Section is its accomplishments. All of its activities are shaped through its individual committees and executed by the secretary-manager. The Committees now function in an advisory capacity, such as the area of public relations, where the Committee, carrying out the wishes of the general membership, advises on the editing of a directory of and guide for consulting engineers, and the method of its distribution. The guide for the selection of a firm was edited in such a manner so as to save a lot of confusion coming from small cities and others that are using and retaining engineers from time to time. This directory took about two months to place into circulation. Once the decision was made to sponsor it, it was handled routinely alongside many other projects. Three thousand copies were distributed to cities, city managers, county engineers, county boards of commissioners, architects and architectural firms, local chambers of commerce, industrial firms, key U. S. and State employees, school board superintendents, general contractors, and others interested in utilizing private practitioners.

Also of public relation value, all member firms are sending to the secretary-manager, Kodachrome 35 mm. slides of pictures of the interior of their offices, highlights of certain work performed, and slides that portray a typical scene of the consulting engineers' work. The presentation of these slides along with a pertinent talk concerning services offered by the practitioner has proven to be a worthwhile enterprise. It is a built-in program that can be given to civil and public official meetings such as district meetings of county and city engineers, and it is planned in the future to cultivate this means of upgrading the public opinion and acceptance of consulting engineering.

The Committee on Professional Relations has as its duty to work with other professions and trades in working out mutual and related problems that affect

The members of the Kansas Society's Functional Section have used the group to publicize the jobs upon which they have acted as consultants. The secretary-manager has given many talks before civil and public officials' meetings showing photographs such as those above of Section member's projects.

consulting engineers. This group developed a final report on the relationship of electrical, mechanical, and structural engineers with their clients and architects. This report includes principles of interprofessional practice for architects and engineers, standards of forms of agreement, and recommended minimum fee schedules and is one of the first of its kind on a state level to be adopted by consulting engineers. The report was sent directly to all architects in the state with the hope that in time it will be helpful in maintaining the continued good relations between engineers and architects within the state.

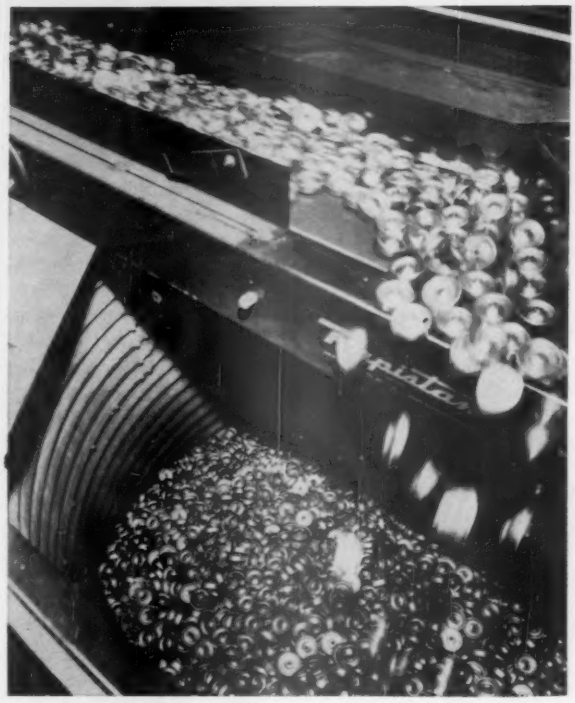
Other matters to come before the Committee on Professional Relations include a problem the general contractors are having about the issuance of plans to contractors for use in bidding on jobs, along with working with the contractors in standardizing technical terms to be included in future plans and specifications. This Committee hopes it is working toward sponsoring a standard building code for the State as well as other worthwhile projects involving other professions and trades.

The Committee on Fees and Salaries has before it this year the matter of establishing a recommended minimum fee schedule for consulting engineers in all fields. Fees of engineers differ considerably from area to area depending upon many factors, and a minimum schedule for maintaining a state-wide balance is necessary. The Committee is coordinating its work with Task Force No. 2 of NSPE and is looking at other states' suggestions, and it hopes to have a schedule ready to adopt by the end of the year.

Ethical matters are of interest to all engineers. The Committee on Ethics and Grievances has had its share of matters given to it for investigation. With a full-time secretary-manager, investigations have proceeded rapidly and action taken in some cases to a successful conclusion. A few examples might be helpful to understand how the Committee works.

A complaint was received a couple of months ago when the new phone directory in Wichita, Kansas, was found to contain a new "engineering company" offering its services some 114 times in bold black type in the yellow pages. A full investigation was made and found the individual involved was not an engineer, nor did he have the qualifications to become one. Business was flourishing. The Committee on Ethics and Grievances reviewed the facts and decided it should intervene. A formal complaint was made to the State Attorney-General's Office, and in due time an injunction action was filed. The defendent, by court order, has been restrained from the practice of engineering and the further use of the name "engineering" within the name of his "engineering company." At the time of this writing the final hearing has been set but not yet heard, and it is anticipated this case will be completed successfully with little difficulty.

In Kansas, it is contrary to the State laws for an engineering firm to incorporate. Not debating the pros and cons of the merits of incorporating engineering firms, the Committee on Ethics and Grievances found that there were some fifteen such Kansas corporations existing in the State, in competition with the private practitioners and engineering firms. Investigating this situation, many corporations were found to be incorporated by persons who were not engineers nor did they have the background of engineering. This factor, along with the fact the majority of the engineering firms of the State are composed mainly of single proprietorships and partnerships and are denied the right to incorporate, was felt to be discriminating. A formal protest was made to the Secretary of State's Office requesting that the status of engineering corporations in Kansas be reviewed and that they be asked to get out of the practice of engineering. The response to date has been good. The laymen, as expected, making "engineering corporations" merely a business enterprise, have rebelled somewhat; but the ones having professional engineers within the firm recognize the Society's position and have cooperated fully.



Whether it is building a dam or taking the kinks out of a production line, Kansas consultants can exchange experiences with one another at interesting meetings.

WHAT is done when a client-owner complains of his engineer's services? Regardless of the engineer's status, member of the Section or not, an investigation will be made. It is insisted a written statement by the complainant be made so as to reduce the facts to a workable issue, following which, an investigation will take place.

The procedure followed in most cases is to have the secretary-manager contact the complaining party

and obtain his story as to the facts involved. The facts are written up for the Committee on Ethics and Grievances to review. If the Committee desires further action, the engineer is contacted and confronted with the facts and his side of the story is determined. The case is then reviewed by the Committee. If it is a matter that can be handled by the Committee, then it is so resolved. Many of the cases can be handled on this level by reprimands, warnings, and other finalizing action. If it is a matter of State Society magnitude, then it can be referred to the State Society's Ethical Practice Committee. This Committee is able to handle the case with a little different emphasis when the facts warrant it, than its sister committee within the Consulting Engineers' Section. An extreme case could be referred from the State Society's Ethical Practice Committee to the State Board of Engineering Examiners for their action concerning the status of the license granted to the engineer. These procedures move rapidly, and it is possible a full investigation and conclusion could be developed within a one-two month period. Many minor complaints are handled within days by the secretary-manager's personal investigation and recommendations. Multiple letters and conference phone calls help out the time element.

One element arising from these investigations when a client complains that has been noticeable, is that the client himself is satisfied the professional society has an interest in his complaint and that the matter is being given attention in a professional-like manner.

Not all ethical matters have been resolved. Short comings of the State Licensing Act, Code of Ethics, and loopholes in the laws make it difficult to bring several cases to a successful conclusion. It can be said however, by investigating fully the cases, the weakness of the profession through its codes and laws are brought to light and action can be taken in the future to correct these problems. It has been noticed, that as a result of active investigations in ethics matters, this fact alone has served as a deterrent to certain borderline practice methods throughout the state and engineers are giving personal attention to their own practice methods.

Correcting some of the weaknesses of the laws affecting engineers is a function of the Kansas Section and points up how the Section best serves the State Society and the Society helps the Section. With a full-time secretary-manager's office operating, it has been designated as the coordinator of all of the Society's proposed legislative activity. The Kansas Engineering Society is made up of various groups such as county engineers, city engineers, land surveyors, ASCE members, and functional sections all of which have certain proposals to submit to the legislature. In order to maintain unity within the profession and to present a coordinated program, each group is sending their proposals into the Section's office for the purpose of screening for possible future presentation. A newly formed organization in the State named the Kansas Society of Land Surveys has asked the Society's help in presenting a new land surveyor's registration enactment this year. Most of these legislative proposals involve the consulting engineer directly or indirectly; and the Section's full cooperation has been pledged.

The cooperation of the general membership has been excellent. When called upon, special committees have formed to work on particular projects, such as public relation pamphlets, writing of new by-laws, investigating problems involved in fees charged for highway work, and ethical matters occurring in a particular city. As an aid to keeping the general membership informed, a monthly newsletter has been adopted to distribute information of interest to the consultants. A clipping service is used for all the State newspapers as a means of keeping abreast of remarks concerning professional engineers. Members in the major cities have been encouraged to begin listing themselves in the yellow pages of the phone directories in a box listing along with the NSPE Seal and a pertinent statement concerning the activities of consulting engineers.

The Kansas Section has grown from 38 to 50 firms in its membership in the few months time it has begun its full-time schedule. It represents some 650 engineers and employees and is represented in nineteen cities. The anticipated growth in the future looks good. Some firms are standing by to see what progress is made before joining and others need a follow-up of their membership invitations. All consulting engineers are welcome to become members of the Section.

The future of functional sections under NSPE auspices is being tried in Kansas to its fullest extent. Kansas has undertaken the full test and so far it has a good report to make back to those wondering about it. The interest across the nation has been high and many requests for information have been received. On March 22, 1958, three new functional sections were authorized to be formed in Kansas under the Kansas Engineering Society. They are: (1) Engineers-in-Industry Section, (2) Engineers-in-Government Section, and (3) Young Engineers' Section. The interest in these three new Sections is high, and it is hoped that in the future they will obtain strength sufficient to fully represent each member interested to their fullest capabilities. As can be seen, the Kansas engineers are sold on the idea that the future of engineering sections lies in the affiliation with the State Society and fully recommend it to those other states interested in a similar program.—End.

It's New . . . It's Quicker . . . It's Better!

What? The AMERICAN ENGINEER's enlarged Readers' Service Department.

Now you can get more information about any ad in the magazine or more data on any "Progress in Products" item, or literature listed in "New Literature," in a matter of days! Look for the card inserted inside the back cover.

It Tells How You Can Take Advantage of This FREE Service NOW!

For Industrial Careers . . .

Professional Development of Engineering Students

These are the final two papers which were presented at NSPE's annual meeting in St. Louis. The other two papers appeared in the September issue.

The Role of the Student Chapter

By

J. NEILS THOMPSON, P.E.

Professor, University of Texas

Massachusetts Institute of Technology

STUDENT chapters are new to the National Society of Professional Engineers. But they are not new as such. At Ohio Northern University in 1939 a professional student chapter was formed. Subsequently this chapter dissolved, apparently because of World War II. In 1947, the Ohio Society of Professional Engineers granted a charter to the Ohio University Student Chapter. At the present time affiliated state societies of the National Society of Professional Engineers have granted charters to nineteen student chapters. Eight of these are in Ohio, four in Texas, two in Michigan, and one each in Florida, New Mexico, Pennsylvania, Tennessee and West Virginia. A number of other state societies have indicated that student chapters will be formed in their areas in the very near future.

For almost two years, NSPE has been working on a program for student chapters. This movement is not new to technical societies, where student chapters have been in existence for many years and have been performing effective services in developing an understanding of their parent societies.

Susceptibility of the Student Engineer to the Professional Concept

The writer believes that it is natural for the student engineer to have an exceedingly high interest in professional matters. Most undergraduates do not have a multiplicity of interests; they are carrying a heavy load of technical studies. They have high hopes for the future and welcome opportunities to get an understanding of the non-technical problems that lie ahead. A professional talk tends to be a diversion. Very often it turns out to be a very profitable diversion.

After graduation, the picture changes. The graduate's interests become diverse; more and more of his time is taken up by technical details. His job is pri-

marily technical and has very few allied professional problems. It is not until his work begins to involve a number of professional problems that his attention is directed to the fact that there is a community of professional interest among engineers.

Interest of the Young Engineer

There is evidence that the young engineer is interested in the professional concept. In 1956, the Texas Society of Professional Engineers adopted a procedure whereby it automatically placed 527 engineering graduates in Texas on its Engineer-in-Training rolls, regardless of whether they desired to be so listed. Each graduate was excused from paying his dues for the remainder of the year. In 1957, 358 of these young engineers paid their dues. This represents over sixty-eight per cent of those originally placed on the rolls.

In 1957, the Texas Society revised its plan. It mailed to 828 engineering graduates an application for EIT membership with the statement that they would be excused from their dues for the remainder of the year. A total of 411 of them joined the Society. It should be kept in mind that many of the Texas engineering graduates leave the State. By the end of May, 1958, over 300 of the 411 had paid their 1958 dues.

Several years ago the writer had an occasion to analyze the membership rolls of the Texas Society and determine what happened to the junior engineers. It was most interesting to find that a very high percentage of them kept up their membership and later became professional members. Rarely did one fail to pay his dues.

RECENTLY an industrial engineer mentioned to Paul H. Robbins, NSPE's executive director, that he was amazed at the professional concept of the young engineers coming out of Ohio. He asked why this was so. Mr. Robbins answered that the student chapter program in Ohio was most significant and was probably the major contributing factor to this condition.

The meaning of the foregoing is that the interest of the graduating engineer is high, and NSPE should provide the tie at this point. Through the establishment of student chapters, the student engineer would feel identified with a professional organization. This would help to maintain his momentum in professional interest during the period immediately after graduation.

NSPE's Reluctance

In the past, the National Society of Professional Engineers has been reluctant to sponsor and promote student chapters for a number of reasons. First, its desire to maintain a legal base in the requirements for membership caused a reluctance in the establishment of a new type of affiliation. Also, the financial resources were (and still are) limited. Too, it was felt the student chapter would have difficulty in competition with the many other extra-curricular organizations at educational institutions. Recent developments have invalidated these and other reasons for NSPE's hesitancy to enter this field.

NSPE's Acquiescence

NSPE's interest in the student chapter movement has become more active because of the existence of chapters in the several states. These states have pressed for more support from NSPE.

For almost two years, engineering unions have been sending publications and speakers to engineering organizations on engineering campuses. In many cases, this material was the only information a student engineer was getting on professional matters. Therefore, it became urgent to reach the engineering student with the NSPE professional viewpoint. The NSPE Engineer-in-Industry Committee has distributed considerable literature to engineering colleges to tell the professional story.

Finally, the Young Engineers' Committee presented considerable evidence that NSPE does not adequately represent the young engineer, because of the limited number of young engineers holding membership in NSPE. As the NSPE Young Engineers' Committee began to develop a program it was realized that one of the most serious handicaps was the lack of professional orientation of engineering graduates. With these factors in mind there developed an increasing interest on the part of NSPE in the promotion of a student chapter program.

NSPE's Enthusiasm

At the annual meeting in June, the NSPE Executive Board adopted a student chapter program which it hopes to inaugurate this fall with at least ten student chapters participating.

The NSPE Student Chapter Committee has envisioned a five-phase program of support which would help:

1. Create a consciousness of the need for professional development of the student engineer.
2. Promote professional development by the organizing of student chapters.
3. Aid in the operation of student chapters.
4. Provide services direct to the student chapter members.
5. Develop a program for the future that would provide professional ties and student magazines.

What is the Role of the Student Chapter?

The NSPE Student Chapter Committee went beyond the simple recognition that professional societies on the engineering campuses are needed. It devoted considerable time to the establishment of an objective of the student chapter program. The NSPE Board has approved it. The objective is to provide a program of professional development and orientation of the student engineer.

The most important aspect of this objective is the creation of a realization on the part of the student that the professional engineering concept embodies technical ability, integrity, responsibility, conduct, purpose, spirit, indebtedness to the past, and desire to contribute to the upbuilding of the profession. On the other hand, professional engineering has certain legal connotations which involve integrity, conduct and technical responsibility.

In many professional schools the professional concept is made a part of the curriculum. But this is true in only a few engineering colleges. Therefore, in order

to fill this gap in the engineering curriculum, NSPE hopes to develop professional student chapters that can provide a program of professional development and orientation.

Student Chapter Programs

The NSPE Student Chapter Committee was most concerned as to how to direct a program which would aid in keeping student chapters on the professional rather than the technical theme. In organizing its plan, the NSPE has provided that student chapters must have at least four professional programs during the year if they are to continue to receive NSPE support. Examples of student chapter programs are:

1. How does one become a registered professional engineer?
2. What is engineering ethics?
3. Professionalism versus unionism.
4. A professional engineer's responsibility in industry.
5. A professional engineer's responsibility in government.
6. A professional engineer's responsibility as a consulting engineer.
7. Employment practices.

These are only a few of the professional type programs which student chapters could have.

NSPE Program of Support

At the present time NSPE has developed a program to assist student chapters that are chartered by affiliated state societies and that meet a standard approved by the Executive Board of the National Society of Professional Engineers. Because this is a new venture on the part of NSPE, it is proceeding slowly in the development of a program which is primarily geared for chapters already in existence and which can meet the approved standard. It is contemplated that in the future NSPE will establish programs of support for those student organizations that do not meet the professional requirements that have been established.

Each year the programs of a student chapter will be reviewed by the NSPE Student Chapter Committee to determine if the chapter may remain on the list of NSPE student chapters eligible to receive support from the National Society of Professional Engineers.

Following the establishment of a program for existing student chapters, it is the plan of the NSPE Student Chapter Committee to inaugurate a plan to assist state societies in the establishment of student chapters in engineering institutions lacking such chapters at the present time.

It will be recognized that in establishing a standard for NSPE student chapters, NSPE is attempting to provide a high level of qualification. This has been done intentionally. The purpose is to stimulate a sense of responsibility in somewhat the same sense that responsibility is placed upon the professional engineer when he becomes registered.

AT the beginning of the school year NSPE provided for each student chapter member a package which contained the September issue of the AMERICAN ENGINEER, the Engineers' Creed, an application card, a student pin, and a membership card. The AMERICAN ENGINEER will be mailed direct to the student in December, January, February, March, April and May.

The officers of the student chapters will be furnished all regular services and publications of NSPE, such as the Legislative Newsletter, Employment Practices Newsletter, manuals, etc.

In the eyes of the public, technically the engineer rates with members of other professions, but professionally the engineer is considered only a technician. The writer is not concerned with the rating but he is concerned with the influence of the engineer on the public and for the good that can result from this influence. The burden is upon NSPE to raise the engineer's professional standing. Unfortunately too many engineers are unprofessionally minded. Therefore, NSPE has a major educational program in its own profession. This is why it believes that much of this program of professional development can be undertaken at the student engineer level.

Engineers who are members of NSPE can be assumed to be professionally minded or they would not be members. Why should NSPE wait until a professional engineer suddenly realizes the importance of the professional concept? The NSPE Student Chapter Committee believes that a program of support for student chapters can materially help to plant the professional seed early, and therefore make possible the early realization on the part of the engineer that the professional aspect is important in the practice of engineering. Teddy Roosevelt once said: "No man has the moral right to withhold his support from an organization that is striving to improve conditions within his profession or trade spheres."—**End.**

Professional Concepts Expected by Industry from Graduates

By

C. Y. THOMAS, P.E.

Vice President, Spencer Chemical Co.

"ALL rules of professional conduct may be summed up in one simple statement. The professional man must be worthy of the trust and belief of his fellowman." (ECPD—A Professional Guide for Junior Engineers.) As I review "Faith of the Engineer" and "Canons of Ethics for Engineers," there is no mention of where an engineer is employed such as in industry, or teaching, or government or in consulting practice. Accordingly, we probably should be using the noun "practice" instead of "industry," though even common usage has given a restrictive definition of practice.

The choice of our assigned subject indicates that someone believes that industry has some fixed ideas about professional concepts. This I have been utterly unable to find or define.

In some vague way practice in a certain area has required our schools to assure the graduate a competence in math, English and his specialty. Very little is done in the area of professional concepts. Certainly there is not a vestige of uniformity in the way our colleges approach the problem.

Whatever professional concepts a young engineer has of the practice of engineering, he simply must have obtained such a grounding in college. If he lacks an understanding of professional concepts, practice can blame only itself for not doing more to whip the problem.

I could speak all day on the details of the make-up of professional concepts. We might differ somewhat if we all attempted such a definition, but I take it for granted that more than any other group of engineers, our NSPE members have a reasonably good understanding of professional concepts and ethics.

Is there a problem? Does industry or practice have the right to expect a thorough grounding in professional concepts or ethics?

Some of you may have had the great good fortune of studying engineering at Purdue. If so, and if you had paid your alumni dues, you received a couple of months ago the results of a 1957 sampling of Purdue's graduate engineers. Of the 24,294 graduates, 1911-1956 inclusive, a questionnaire was sent to 5,429. Returns came back from 3,799 engineers, seventy per cent of the total, well distributed in age groups as well as in the nine engineering curricula.

How Employed?

Private Industry	**73.4 per cent**
Government	**9.4 per cent**
Private Engineering Practice	**5.0 per cent**
Self-employed	**4.4 per cent**
In Education	**4.1 per cent**
Other	**3.7 per cent**
	100.0

Here are some perfectly shocking facts as revealed in this questionnaire:

a. A bare majority, fifty-four per cent believe that engineers never should join unions if they wish to retain their professional status.

b. Twenty-five per cent believed that engineers could belong to a collective bargaining group and still maintain their professional status.

c. Forty-one per cent said "no" to the question, "In your opinion, does professional engineering status require membership in a professional engineering society?" Only thirty-seven per cent answered "yes"; twenty-one per cent expressed no opinion.

d. Only forty-eight per cent of the grads are either fully licensed or EIT's. If it were not for the high per cent of EIT's, in these latter years, the per cent of licensed engineers would be woefully low.

The Purdue survey, if typical of all engineering schools, very clearly poses a real problem for our profession. We have our work cut out for us. The subject of requirements for a degree in engineering will never be settled. Sputnik has forced a few changes. The principal criticism against engineering curricula has been an excessive loading of technical subjects, not enough of the humanities. About all I can conclude from the Purdue questionnaire results is that our colleges are failing miserably in teaching the professional concepts of the practice of engineering and that we had better move in on them in every reasonable manner to change the trend from a trade to a profession.

EVERY engineering graduate presumably learned basic moral values around the family fireside. In a very few cases, parents and family were able to discuss ethics and moral values in the business world. Very largely then, the only place our neophyte engineer could learn professional concepts was his school. It is believed that one gets professional concepts in many ways, formally from credit courses, informally in student organizations, conversations with campus visitors, etc.

The best known report on engineering education, the ASEE report first published in June, 1954, as an interim report, known to many as the Grinter report in its summary, says "Engineering education must contribute to the development of men who can face new and difficult engineering situations with imagination and competence. Meeting such situations invariably involves both professional and social responsibilities."

The first objective of an engineering education is technical. Here's what the Grinter report says about the other objective:

"The second objective, the broad social goal of engineering education, includes the development of leadership, the inculcation of a deep sense of professional ethics, and the general education of the individual. These broad objectives include an understanding of the evolution of society and of the impact of technology on it; an acquaintance with and appreciation of the heritage of other cultural fields; and the development of both a personal philosophy which will insure satisfaction in the pursuit of a productive life and a sense of moral and ethical values consistent with the career of a professional engineer."

The Grinter report agrees with previous ASEE reports that about one-fifth of the curriculum should be devoted to humanistic and social studies and, further, that one-tenth of the curriculum should be for electives.

I have read and re-read the Grinter report several times. I do not find particular mention of professional concepts, either under Humanistics or Social Sciences or under the electives. The report mentions a conference with employers of engineers, with seven of the largest employers, in fact, to review the first draft of the report. No mention of ethics or professional concept is recorded. A further discussion among a number of smaller companies on a later draft of the report raised two principal areas—deficiencies in technical competence and effective communication.

Some years ago, just about the time NSPE was being founded, late in 1932, to be exact, the founder socie-

ties voted to establish ECPD. This was the outcome of some very fine work principally on the part of Dr. Wickenden, whose article, "The Second Mile" is familiar to all of us. The original ECPD charter provided a 4-point program.

1. Means to assure entrance to the profession by young men who have the necessary aptitude and capacity.
2. Criteria for colleges of engineering to insure graduates a sound educational foundation.
3. Plans for furthur development of graduates.
4. Methods of recognizing engineers who have met suitable standards.

Dr. Carl Compton gave the accrediting program its real impetus. The basis of accrediting, which was approved in 1936, included the following fundamental:

1. Absolute standards of the educational process are to be avoided as likely to fetter future progress.
2. Curriculums are to be accredited, not schools.
3. The institutions are to be investigated by visits of qualified individuals to evaluate qualitative criteria.
4. Quantitative criteria were to be evaluated from records, reports, and answers to questionnaires.

In general, ASEE can be credited with pushing the founder societies into establishing ECPD, and through the years we have looked to ECPD to carry the ball for a great many other professional activities. From its very founding, NSPE has been concerned with many of the same activities, and we are very fortunate that there has been such close cooperation between ECPD and NSPE.

Clarence Davies, long-time secretary of ASME, speaking at the Silver Anniversary Dinner of ECPD, unfolded the history of ECPD. If you don't have a copy of the ECPD's twenty-fifth annual report for the year ending September 30, 1957, I urge you to get one. In this report you can read Mr. Davies' speech in its entirety.

Many of you are Rotarians. You are familiar with Rotary's very short code—the Four Way Test:

1. Is it the *truth*?
2. Is it *fair* to all concerned?
3. Will it build *goodwill* and *better friendships*?
4. Will it be *beneficial* to all concerned?

On numerous occasions I have said that every engineer should have constantly before him two codes, both of which came originally out of ECPD. Arthur Parsons, long-time secretary of the mining engineers, without change by the Ethics Committee of ECPD. Out of ECPD also came Canons of Ethics for Engineers, to which NSPE and about all other engineering societies have subscribed.

ECPD does its work primarily through an executive committee and through seven standing committees, i.e.

1. Guidance
2. Education & Accreditation
3. Student Development
4. Training
5. Recognition
6. Ethics
7. Information

Now speaking generally about ECPD, Clarence Davies pointed out that ECPD "was visualized as a body where the views of engineers in practice would be joined with those of educators in dealing with the broad problems of the professional growth of the young engineer." In 1933, when ECPD really got underway, 14 of the 21 men wo made up ECPD were from practice. Today, of the 24 men making up ECPD, only 10 are from practice.

THE present ECPD Executive Committee is made up of a chairman and a vice chairman plus one number of each of the eight organizations which constitute ECPD. Six of these men are from business, four from colleges. It is a different story as we review the combined list of the Council and Standing Committee personnel. There might be a slight error in this tabulation, but, as I see it: 64 men are from colleges; 41 men are from industry; 15 men are consulting engineers; 18 men are professionals in our technical societies, and one man is from government.

I don't mean to be critical of the present setup. I merely suggest that we need to have all areas of the engineering profession on the ECPD Executive Committee and on its standing committees so that no problems will be overlooked or neglected. Certainly those of us in practice must not complain if we are unwilling to take the time to serve ECPD.

Let me focus your attention for a moment on the Student Development Committee of ECPD. This Committee is composed of thirteen members. Twelve of these men are from colleges and only one, our own John Coleman, is from practice.

It is a purely personal opinion that every committee in ECPD should be well balanced in the background of its membership.

NSPE should be a constituent member of ECPD. Our NSPE committees are working very closely with ECPD. Certainly NSPE has more in common with ECPD than any of its present members.

It is in the record that NSPE is not yet a member of ECPD because to date ASCE and AIChE have not granted approval of NSPE's application. May I say to you who are members of ASCE and AIChE that their withholding of approving NSPE's application is a disservice to the whole engineering profession. Let us hope their approval will be soon forthcoming.

The experts say that they can draft a questionnaire to get any answer they want. This might be true when the questionnaire is sent at random. In my case I circularized seventeen companies in my home town employing 2,308 engineers. In most cases some of the top brass were personal friends on whom I could depend for careful and realistic answers. Three of my questions were:

It is true that the engineering courses at various colleges vary considerably. I should like to know how you recall visiting with your young engineers, preferably those just out of college, your ideas about the following questions:

a. Do these young men seem to have an adequate sense of responsibility toward their profession?

b. Do you believe they understand the canons of ethics of engineers to which all engineering societies

have subscribed, the code of ethics which every state board of engineering examiners requires, etc.?

c. Assuming that the young man is qualified technically in his chosen field, what are the things you find generally necessary to work on in developing young engineers for a greater responsibility, whether it be in strictly engineering or management?

Only three thought their newly graduated engineers did not have an adequate sense of responsibility to their profession. Three more gave qualified "yes" while nine gave an unqualified "yes." Frankly, this is a better answer than I had expected.

I was shocked to find that only four of our companies thought the young engineers had an understanding of professional ethics. This was what I had expected and I suspect that this is a true norm for the nation.

When I asked management to tell me briefly where they had to work to develop the young engineers—or stated in another way—give me the areas in which the youngsters were deficient, I got 30-odd answers, in order of frequent mention:

1. **An ability to work with others.**
2. **An understanding of the principles of good management.**
3. **An initiative.**
4. **In cost consciousness.**
5. **In communications, written and oral.**
6. **In a genuine sense of responsibility.**
7. **In ability to stay with an assigned task.**
8. **In thoroughness.**
9. **In loyalty.**
10. **In self-reliance.**

My Kansas City questionnaire covered a variety of employers, not including my own employer. I think this is a fair sampling because it covers some nationally known companies like Bendix, Westinghouse; some nationally known engineering firms like Howard, Needles, Tammen and Bergendoff; Black and Veatch; J. F. Pritchard, and Burns and McDonnell.

You will be interested to know that not one of these companies requires registration as an engineer or EIT for employment. Four of the seventeen seem not at all concerned with registration and do not urge their engineers to register.

I have very strong feelings about an engineer paying for his licensing and then paying his annual dues; also, I don't think an engineer is a credit to the profession who does not belong, at his own expense, to his technical society.

I am pleased to report that only four of our Kansas City companies pay all or any part of licensing costs and, again, I am happy to say that only four, and not the same four just mentioned, pay all or any part of an engineer's technical society dues. Several of the companies quite properly pay the dues for engineers who are asked to join other technical organizations for their employer's benefit.

As I try to draw to a conclusion, it is certainly evident that I have strayed afar from my assigned subject. Apparently industry, or practice, has had no reason to become concerned over our young engineering graduates having an adequate sense of responsibility toward their profession. However, in my many conversations over the country, and from my very limited Kansas City questionnaire, it seems to be universally true that most employers do not believe that the young engineer is adequately grounded in professional ethics. This is an anomalous situation which is hard to understand. How can young men, possessing an adequate sense of responsibility towards the engineering profession, lack an understanding of ethical principles in the practice of engineering?

I think we must conclude that this is not an industry problem but one for all in the practice of engineering. Neither do I believe it to be a short-range program. I am convinced of the fact that were engineering a 7-year course like medicine, or law, there would be few, if any, professional problems for us. Leaders in our profession long ago recognized these problems. Many fine things have and are being done to help develop professional concepts among all engineers.

I suspect our greatest problem is keeping in touch with the graduate engineers, who may or may not be in practice, who belong to no technical or professional engineering societies, who attend no meetings, who read little about the advancement in the engineering profession. Nothing would please me more than to have an integrated engineering profession. How wonderful it would be if no one could get an engineering degree without passing the EIT examinations the latter part of his senior year and becoming an EIT, whether or not he expected to be in the engineering practice four years hence. All of us believe that when we are able to achieve more unity in the profession that there is bound to be a much wider and broader understanding of the profession and its problems. I think we must do everything possible to get NSPE into ECPD. There is no questioning the fact that we all need to more actively support the ECPD and the NSPE programs for helping the youngsters just before graduation and immeditaely thereafter develop a sound and thorough understanding of professional engineering concepts and ethics.

Concern over morals, over conduct, over behavior, and the ethics involved is as old as recorded history. Not only our own Bible, but the beliefs of other religions have long set the patterns for ethical behavior. That is why in this world today it is so exceedingly difficult to understand the theory that any act is justified if the purpose is accomplished. It is true that there are many groups in ancient lands who are not Christians, may I say, who believe that only fools tell the truth. Frankly, I am flabbergasted over atheistic Russia's communism. Stalin murdered seven or eight million to achieve his purpose. Under such rule, what is honesty? Or integrity? It would seem to me that a code of ethics to an atheist or communist would be about as foreign to his make-up as a pig in Sunday School. I thank God that we have in our grand old U.S.A. a bulwark of professional honesty. I am tremendously proud of NSPE, which devotes so much time and energy to the continuing problems, "Professional Ethics and Concepts in the Engineering Profession."—**End.**

REGISTRATION

(Continued from page 15)

chitectural work for the last 16 years." Upon being notified by the Board that its original decision remained unchanged, the applicant filed a successful complaint seeking to have the court order the Board to issue him a license without examination.

On appeal, the State Supreme Court noted that the Arizona statute provides that evidence submitted for registration must satisfy the Board that the applicant is fully qualified to practice the profession for which registration is asked, and that if in the judgment of the Board the applicant has not furnished satisfactory evidence of qualification, it may require him to submit to an oral or written examination.

Except for persons holding valid licenses from other states, regulations of the Board implementing the statute provide that an examination is required of all architectural applicants who do not have a degree from an accredited institution, unless in the Board's opinion the applicant has a proven experience record of an unusual and comprehensive quality.

Holding that the legislature established sufficient standards in the statute for the Board to follow in passing on the applications before them, the Court concluded that the rules promulgated and followed "are well within those bounds, and this discretion, vested in the Board by the legislature, was not abused in the instant case. * * * We fail to see wherein the Board has abused its discretion in so evaluating [applicant's] record." *(Board v. Bauer.)*

This Month's Authors . . .

Mr. Dodd

Stanley P. Dodd has been technical director of Chicago Apparatus Company since January, 1956, and has more than two years experience in the chemical and scientific instrument fields. He holds a bachelor of science degree in organic chemistry from the University of Chicago and did graduate work there in the same field.

△ △ △

Mr. Schnacke

Donald P. Schnacke is a licensed professional engineer and attorney at law in the State of Kansas. He is a member of the National Society of Professional Engineers, Kansas Engineering Society and the Topeka Engineers Club, American, Kansas, and Topeka Bar Associations. He was named the full-time secretary-manager for the Kansas Consulting Engineers' Functional Section in March, 1958.

A native Kansan, he served with the U. S. Marine Corps during World War II and received his B. S. degree in mechanical engineering from Oklahoma State University and his LL.B. degree from Washburn University of Topeka. Prior to taking on the work for the Kansas consultants, he had been with the petroleum industry and the Department of Defense before undertaking his legal training and practice of law in Topeka, Kansas, with the firm Crane, Martin, Claussen, and Ashworth. He has co-authored an engineering technical article for an engineering journal and authored a case note for his state Bar Journal.

Mr. Thompson

J. Neils Thompson is a professor on the civil engineering faculty at the University of Texas, where he received his B.S. and M.S. degrees in C.E. Director of the Balcones Research Center at U.T., he is also active in various Texas business enterprises. His previous employment prior to joining the University in 1941 was with the Texas Highway Department.

An NSPE national director, he is a past president of both the Travis Chapter, TSPE, and the Texas State Society. He is a member of a number of engineering organizations and has served as president of several civic groups. He was the winner (with Prof. Phil M. Ferguson) of the Wasson Medal for Noteworthy Research in 1953, presented by the American Concrete Institute.

△ △ △

Mr. Thomas

C. Y. Thomas, general vice president, Spencer Chemical Company, was born in Roanoke, Va. He received his B.S. deegree in mechanical engineering from Purdue University in 1921 and his M.E. degree in 1926. Until assuming his present position in 1946, he had been employed by the Santa Fe and Kansas City Southern Railroads, Pittsburg and Midway Coal Mining Company, and the Military Chemical Works.

A former regional vice president of NSPE for three years, Mr. Thomas is also a member of several other engineering organizations. He is a trustee of Midwest Research Institute, Baker University, University of Kansas City, and Southern Methodist University. He is a member and past chairman of the Kansas State Water Resources Board.

RADAR

(Continued from page 25)

nel living quarters, radome towers, tall aircraft alarms towers and tropospheric scatter system antennae for over-horizon communication. A main DEW station may be manned by up to forty-eight civilians and military technicians.

Right now, a DEW line of ground radar towers is under construction across the arc of the Aleutian Islands. Chains of underwater "listening lines" are being built parallel to American coasts to detect missile-launching submarines several hundred miles at sea.

Two more gigantic "Texas Towers" are being completed off Nantucket and New Jersey, supplementing the triple-radomed equipment now standing in the Atlantic 110 miles off Cape Cod (see photo).

The intricate "Interior Zone" of radar stations, continent-wide and offshore networks extending to the Mexican border, is being bolstered, modified far beyond the present 12-mile-high bomber fence. As the headband tightens to leverage applied by American engineering, the man-made studs increase and stand out, mute testimony to American fabrication achievements.—**End.**

"Dollar-a-Year" NSPE Fund Campaign is Announced

- Members to Receive Details this Month
- "Project Ambassador" is Key Feature

Although emergency in nature, a one-time effort, the effects of an extraordinary fund-raising campaign announced to 46,000 members of NSPE are likely to be felt by the Society for a long time to come. Doubly good use will be made of every cent members contribute, not only to tide things over until the membership considers readjustment of the dues structure to catch up with the increased expense of activities but also to launch an idea that may very well be the dawn of a new era in NSPE public relations.

Project Ambassador, a key feature of the campaign, is another step toward professional engineers assuming a responsibility for the peace and security of the world. While it shares the future with all of the projected or continued programs of the Society, the basic reasons for *any* kind of fund-raising campaign at this time deserves prior explanation. The need for additional funds is not surprising to those familiar with the Society's ambitions.

In the months of soul-searching which preceded announcement of this campaign, there was a definite reluctance to resort to a general assessment of the membership. Those responsible for the Society's finances felt that when a member has paid his dues he is carrying his share of the Society's burden. But the urgent need for additional money was in no way lessened by such a reluctance, and it became clear that the only satisfactory solution lay in the direction of wholly *volunteer* contributions from those members who think enough of engineering as a profession to heartily support the organization that represents professional engineers.

It is true, of course, that operating costs have increased as a result of creeping inflation, but this, in itself, could be weathered until dues are increased in proportion to meet regular administrative expenses. This would mean more or less of a storm-shelter existence for some months, during which many desirable projects and plans would have to be temporarily shelved. A danger exists in shelving worthwhile projects—too often they are never revived; too often the opportunities for effective action are diminished or lost forever. It is in this respect that funds are urgently needed—*so that NSPE can do things the profession needs done now.*

Not unlike many similar organizations, NSPE once had the money with which to *start* programs but it does not now have the money to continue them properly. Among these programs are the needs of an expanded membership, the organization of new student chapters, further studies by the Professional Engineers Conference Board for Industry, more work in the areas of employment practices and ethics.

Prestige earned by hard, conscientious work has also levied upon NSPE an obligation to implement the administration of industry-sponsored scholarship programs, and to put teeth into its Canons of Ethics. And, perhaps most vital of all, there is the continuing accountability to achieve greater understanding, and thereby greater utilization, of the professional engineer on the part of industry and government.

All of these things have been capsulated into a truism: *professional prestige demands professional responsibility.* Normally this is a long-range viewpoint, but right now, in plain language, it also means that there are occasions when those who enjoy the benefits of professional prestige must assume an immediate duty to keep that prestige progressing healthily. This fund-raising campaign is definitely one of those occasions.

Because an outstretched, upturned palm unaccompanied by a specific request runs the risk of being considered pointless and confusing, the Society Income Committee devised an angle that tends to make individual contributions more equitable. The widely-acclaimed *Dollar-a-Year* plan asks that members write a check which is

To Act as "Project Ambassador" Judges

C. Y. Thomas

Wm. F. Ryan

A. A. Potter

Three distinguished engineers will serve as a panel of judges for the "Project Ambassador" project. They are C. Y. Thomas, vice president, Spencer Chemical Co.; William F. Ryan, former vice president, Stone & Webster Engineering Corp., and A. A. Potter, dean emeritus of engineering, Purdue University.

equal in dollars to the number of years they have been a registered professionl engineer, thus relating the amount given to both prestige and responsibility—on the theory that the longer an engineer has been registered, the more professional responsibilty he should assume. By the same token, this gives the younger engineer, who may be struggling a bit with the cost of living, a chance to play his part without bringing on a family financial crisis.

Once the unique *Dollar-a-Year Engineer* concept had been adopted, it was suggested that while the contributor would receive full benefit from the activities for which the funds would be spent, it would be proper, even though not absolutely necessary, to make at least a token recognition of the willingness to help out voluntarily, over and above the standard membership dues, when the only reason for doing so is a firm belief in professionalism and the Society's aims and purposes. As a result all those who contribute ten dollars or more to the fund will receive a *personalized* desk nameplate. This is indeed a handsome addition to any office, available to contributors in a choice of attractive gray, walnut or black finishes and with the name, in neat white letters, followed by the proud designation "P.E." These desk nameplates will serve a dual purpose; first, it will identify rather exclusively those who, in this instance, indicate an active interest in advancing the engineering profession, and second, will identify the individual as a professional engineer

There have been many indications over the past several years of the increasing reliance on technology in our relations with the peoples of the world. The Society has recognized the importance of engineering in the Point IV Program, and many U.S. industries are sending hundreds of engineers to foreign lands to develop their interest in those areas. Since any citizen of the United States carries a responsibility of representing our ideologies and concepts of behavior, it is important that the individual members of the profession and the profession as a whole realize this important role. Committees and leaders of the Society have on numerous occasions had opportunity to discuss the responsibility of professional engineers on foreign assignments in these relationships. It is felt that the Society should know more about these problems, and it is believed that Project Ambassador will provide an opportunity for a member of the Society and his wife to obtain such first-hand information and to bring it back to the Society for its better understanding and programming in this important responsibility. Requests for voluntary contributions to an expanding future provide an excellent opportunity to accomplish a pilot run of the idea to extend ambassadorial courtesies to engineering societies of other nations on a professional level. The implementation of this idea gives additional incentive for members of NSPE to participate as *Dollar-a-Year Engineers.* Project Ambassador will develop into an interesting trip, all expenses paid, for some, as yet unknown, member of NSPE.

Having no preconceived notion as to where it would be most advantageous for the first ambassadorial representation, the Committee decided that the engineer-member selected should have the right to select any one of four areas—England and Western Europe, Central and South America, Southeastern Asia and Australia-New Zealand or Canada. Wherever he goes NSPE will arrange for him to meet with professional engineers and their organizations and to visit outstanding engineering and scientific installations.

This handsome desk name-plate will be given free to all those who contribute ten dollars or more to the fund drive.

It is not intended that this ambassador shall be charged with convincing engineers in other parts of the world that American engineers and engineering have no superior. This, of course, is not necessarily true. What is hoped to be gained from this trip is that the membership of NSPE will have a better understanding of the professional problems of engineers in other countries and will be able to be of assistance to those engineers who may have foreign assignments in the future. Interest in this program has been expressed by the State Department as another meritorious step forward in President Eisenhower's people-to-people program because it will open up a new level of contact with America's friends and allies.

Speech-making, social functions and summit meetings on this tour will be tailored to the capabilities of the engineer selected to represent NSPE. The question as to *who* among NSPE's thousands of members would make the ideal representative can hardly be left to chance, but the Committee was convinced that certain criteria would *not* be a basis for selection. For example, age makes little difference because both a young man and an older man could equally well be representative. Formal education, income, and big-city residence and big company affiliation are not important factors.

And because there is too fre-

(Continued on page 45)

AE Meetings of Note

Society of Photographic Scientists and Engineers—Annual Conference, October 6-10, Seneca Hotel, Rochester, New York.

National Electronics Conference—Annual Conference, October 13-15, Hotel Sherman, Chicago, Illinois.

American Society of Civil Engineers—Annual Convention, October 13-17, Statler Hotel, New York, New York.

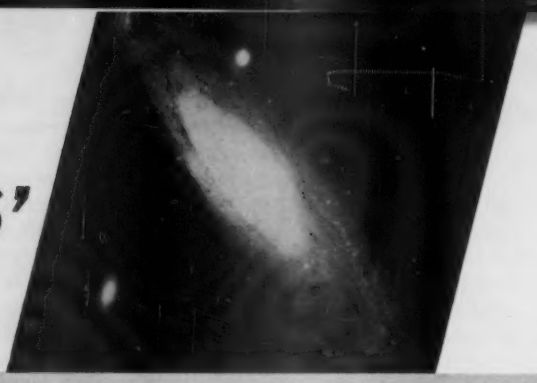
American Institute of Consulting Engineers—Annual Dinner, October 14, Waldorf-Astoria Hotel, New York, New York.

American Society of Safety Engineers—Annual Meeting, October 21, Conrad Hilton Hotel, Chicago, Illinois.

American Institute of Electrical Engineers—Fall Meeting, October 26-31, Penn-Sheraton Hotel, Pittsburgh, Pennsylvania.

Use these aids for

NATIONAL ENGINEERS' WEEK . . .



HERE ARE the basic promotional aids that will give dramatic impact to your program—the kind of impact that will result in public attention in local newspapers, and on radio and television programs. All these aids have been prepared to show the contributions of engineering to our modern age. Use the handy order coupon below.

1. **One-Minute TV Films:** A set of five one-minute TV films dramatizing the theme of the 1959 National Engineers' Week. Produced under expert supervision to meet network standards, the films call attention to role of the engineer in building for the "age of space." Network TV performers. Each film planned to qualify for public service TV time during station breaks. A set of these five films will give wide coverage to your Engineers' Week program. Price: Set of five films, $25.

2. **"Engineering . . . for the Age of Space:"** A 15-minute tape recorded radio program telling the story of how engineering is bringing about man's new era. Radio network performers dramatize the contributions of the engineer in meeting the challenges that are involved in the exploration of our solar system and beyond. Excellent for use on public service radio time. Price: $6 each.

3. **Lapel Buttons:** A high-quality lapel badge featuring a white design on a blue background. May be distributed to high schools, science clubs, and other groups. Each chapter or state society can set its own price for button sales. Prices: 100 to 500—15¢ each; 500 to 1,000—10¢; 1,000 to 3,000—7¢; 3,000 to 5,000—5¢; and over 5,000—4¢.

4. **Set of Seven TV Slides:** Obtain extensive TV coverage through the Week with these slides displaying poster-type art work and printed copy calling attention to engineering. May be used during all TV station breaks as public service announcements. Price: $10 per set of 7 slides.

5. **Posters:** Colorful 9 x 11-inch pasteboard posters carrying the 1959 Engineers' Week design and theme. This is the basic promotional item for calling attention to the Week. Use on bulletin boards, in window displays, school exhibits, etc. Large size (18 x 22 inches) also available. Prices: 9 x 11, $4 per 100; 18 x 22, $5 per 100.

6. **Paper Banners:** Excellent for display use. Three feet long by 6 inches wide. Has poster design and words "National Engineers' Week" in color. Price: $4 per 100.

7. **National Engineers' Week Seals:** Use these brightly colored seals on all office mail from now through February 28. Poster design printed on 1½-inch gummed paper. Price: $3 per 1,000.

8. **Newspaper Mat Story on Engineers and the Exploration of Our Solar System:** A feature article on the way in which engineering is providing factual answers to questions that only a few years ago were strictly in the realm of speculation. Prepared on mat, with illustration, ready for immediate insertion in daily or weekly newspaper. Price: 50¢ each.

9. **Newspaper Mat Story on What Kind of Educational Background a Graduate Engineer Needs Today:** A feature article on the extent of secondary and college education needed for an engineering degree. Emphasizes the importance of a solid foundation in mathematics and the physical sciences. Prepared on mat, with illustration, ready for immediate insertion in daily or weekly newspaper. Price: 50¢ each.

10. **Logotype:** A metal cut of a poster design to insert in advertising, special sections of newspapers, industrial house organs, magazines, and other printed matter. All state society and chapter publications should have one. Price: $1 each.

11. **"Engineering Builds Broader Horizons:"** A re-issue of the 15-minute tape recorded radio program distributed last year. Just as timely this year. Network performers dramatize the engineering developments behind every phase of the International Geophysical Year. Price: $4 each.

Use this coupon to order your aids now!

National Society of Professional Engineers
2029 K Street, N.W.
Washington 6, D. C.
Sirs:

Please rush me items indicated. I enclose a (check.....) (money order.....) in the amount of $..... I understand remittance must accompany order.

NAME_____
(PLEASE PRINT)

ADDRESS_____

CITY_____ STATE_____

1. _____ One-minute TV films @ $25 per set.
2. _____ Radio tape "Engineering . . . for the Age of Space" @ $6 each.
3. _____ Lapel buttons: 100-500 @ 15c ea.; 500-1,000 @ 10c ea.; 1,000-3,000 @ 7c ea.; 3,000-5,000 @ 5c ea.; over 5,000 @ 4c ea.
4. _____ TV slides: set of 7 slides @ $10 per set.
5. _____ Posters: regular size @ $4 per 100.
   _____ Posters: large size @ $5 per 100.
6. _____ Banners @ $4 per 100.
7. _____ Seals @ $3 per 1,000.
8. _____ Newspaper mat story on engineers and the exploration of our solar system @ 50c ea.
9. _____ Newspaper mat story on educational background for engineering @ 50c ea.
10. _____ Logotypes @ $1 ea.
11. _____ Radio tape "Engineering Builds Broader Horizons" @ $4 ea.

"Mackinac Bridge Diary"

Color Film Available for Engineers' Week Showing

"Mackinac Bridge Diary," a 27-minute color film depicting the building of the world's longest suspension bridge, will be available to NSPE affiliates for showing during the 1959 National Engineers' Week, February 22-28.

Through special arrangements with NSPE, the United States Steel Corporation will make available 150 prints of the film to local chapters and state societies. John L. Bahr, national chairman of the 1959 observance, termed the cooperation of United States Steel officials "an outstanding example of the kind of contribution a major industrial firm can make to the success of the National Engineers' Week program."

Typical Scene

Construction workers in a typical scene from the United States Steel film showing the engineering achievements represented by the design and fabrication of the Mackinac Bridge.

The magnificent 16mm color film follows the step-by-step construction of the newly completed Mackinac Bridge across the Straits of Mackinac leading to the upper peninsula in Michigan. It is a pictorial story of the conversion of 67,300 tons of steel, 41,000 miles of wire, and 440,000 yards of concrete into the world's longest suspension bridge. Appearing in the film is Dr. D. B. Steinman, designer of the bridge, and first president of NSPE. Dr. Steinman is shown signing the engineering report which concluded that "building a bridge across the Mackinac Straits is entirely feasible, both physically and economically." It was this report that led to the authorization of the construction of the $96,000,000 project.

Reservations for the film must be made by January 9, 1959. Return address cards for the reservations and a pamphlet describing the film are included in the promotional kits for Engineers' Week being mailed to all local chapters and state societies during this month.

Requests for reservations for the film should be sent to United States Steel, Pittsburgh Film Distribution Center, 525 William Penn Place, Pittsburgh 30, Pa. Additional reservation cards will be mailed from the National Society to all NSPE groups along with an Engineers' Week Action Letter in November.

In other early developments in Engineers' Week planning it was announced that fifteen leading engineering figures have agreed to act as sponsors for the observance. (See news story in the front section of this issue for the complete listing of sponsors.) Names of the sponsors will appear on a letterhead mailing for the Week being sent to a list of 800 newspaper publishers and 600 industrial executives. The mailings call attention to the objectives of the Week, and solicit the cooperation of the press and industry in local chapter projects.

Chapter and state society presidents and secretaries should be receiving the promotional kits mailed out from the National Society headquarters this month. The kits contain five sections devoted to suggestions for developing a basic Engineers' Week program at the chapter level. The suggestions cover newspaper publicity, radio and TV public service time, exhibits, and ideas for a number of special projects. A new section this year is designed to offer suggestions for planning and organizing projects involving school groups and educational matters.

The jacket design for the kits repeats the "astronomical" design of the 1959 Engineers' Week poster. The theme for the 1959 Week is "Engineering . . . for the Age of Space." This theme was selected to call attention to the role played by science and engineering in bringing about the new era which America and other nations are now entering —the era of the exploration of the space outside the atmosphere of our planet.

The 1959 theme will be the basis for newspaper and magazine articles, prepared speeches, and radio and TV announcements. The theme will also be used in career conferences for high school juniors and seniors, exhibits on engineering achievements, and many other projects dramatizing the importance of a sound educational background in mathematics and the physical sciences.

Promotional aids such as one-minute TV films, radio tape recordings, posters, banners, logotypes, newspaper mat stories, lapel buttons, and gummed seals are again available from the National Society. Order forms describing these promotional aids and listing prices will be sent to all NSPE groups.

CLASSIFIED ADVERTISING

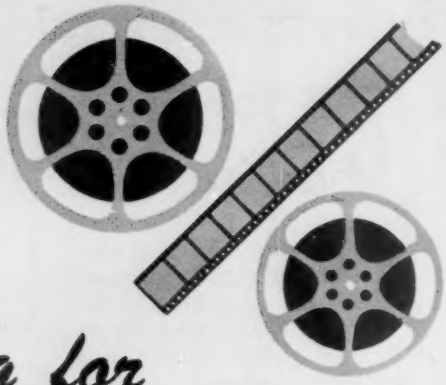
Minimum 3 lines.
Undisplayed, $1.80 per line. Three or more consecutive insertions $1.50 per line each.
Displayed: Same rate as General Advertising.
Positions Wanted: Undisplayed, 90¢ per line. Three or more consecutive insertions 75¢ per line each. Displayed: General Advertising rates, less 50%.
Box Number chargeable as one line.

Mail Box Number replies to:
AMERICAN ENGINEER
2029 K Street, N.W. Washington 6, D.C.

Position Available

CITY ENGINEER, Jamestown, N. Dak. (Pop. 14,000) Must be graduate, registered civil engineer. Salary range $5,500-$7,500. Write Wm. Westley, Mayor.

NSPE Presents:



"Building for Professional Growth"

Here is a film covering the activities of the National Society of Professional Engineers at the chapter, state, and national levels. A milestone in the NSPE public relations program, "Building for Professional Growth" is a filmed presentation on the values and benefits of Society membership. Activities covered in the film include NSPE efforts in registration; research projects such as the Income and Salary Survey, the Professional Engineers Conference Board for Industry reports; legislative cooperation; National Engineers' Week, and other programs. Also included are scenes from actual chapter, state, and national level meetings.

"Building for Professional Growth" can be shown on any 16mm sound projector. Reservation requests should be made for three choices of dates. Notification of available date will be sent from NSPE headquarters immediately after each reservation request is received.

RENTAL FEE: $10

(Includes 8-page booklet "Ideas For Your NSPE Film Program," and 15-minute talk on NSPE.)

Use this coupon to reserve your film

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
2029 K St., N.W. • Washington 6, D. C.

Please reserve us the NSPE film "Building for Professional Growth" for the following choice of dates:

_____ (1st) _____ (2nd) _____ (3rd)

SHIP TO:

Name_____

Street_____

City_____ Postal Zone_____ State_____

(Make checks payable to National Society of Professional Engineers)

Board to Preview New Society Film In San Francisco

"Building for Professional Growth," the newly completed NSPE film, will be previewed by the Board of Directors at the fall meeting in San Francisco this month. The Directors will see the film on Friday morning, October 24.

The 20-minute, 16mm sound film is available to all NSPE affiliates after October 15. Reservations for prints may be made throughout 1958-59. A $10 rental fee has been asked by the National Society to help defray shipping and print costs.

A public relations news letter calling attention to the film was sent to all chapters and state societies in September. The news letter included a coupon for reserving the film.

Because of the limited number of prints available, chapters and state societies are requested to list three choices of showing dates. Prints will be shipped from the National Society headquarters in time for showing on one of the three dates listed. Reservation dates will be confirmed by letter from the National Society well in advance of the scheduled showing.

With each print of the film will be sent an 8-page booklet entitled "Ideas for Your NSPE Film Program." This booklet suggests specific ideas for chapter and state society use of the film to help inform potential members—and existing members—about the purposes, objectives, and accomplishments of the National Society. The booklet emphasizes the importance of the film as a "selling device" for reaching potential chapter members.

In addition to the booklet, each print shipment from the National Society will include a copy of a 15-minute talk on the organization and objectives of NSPE. The talk was prepared for delivery to potential members at chapter membership meetings—at which the film is shown. Copies of the talk may be reproduced by local chapters and distributed to potential members as "take home" literature.

"Building for Professional

Growth" is believed to be the first film ever made for the purpose of calling attention to the values and benefits of membership in an engineering organization. For the first time, all local chapters and state societies affiliated with NSPE have a filmed presentation of the three-level activities of their professional engineering society.

The film was produced for the National Society by Sid Alpert Productions, of Washington, D.C. Scenes of engineers at work were contributed by the Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota.

The film can be shown on any 16mm sound projector. Inquiries concerning reservation dates should be made to the NSPE headquarters, 2029 K Street, N.W., Washington, D.C.

All news for the "With the Auxiliaries" column should be sent directly to Mrs. Garvin H. Dyer, 10011 East 36th St., Independence, Mo.

All other state society and chapter news should be sent to the AMERICAN ENGINEER *immediately after the events take place*. And if photographs are taken, be sure and send them along too!

Society to Review Union Problem at Fall Meeting

• Landis to Talk on Functional Plan

• Directors to Preview Two Films

Current union efforts to organize registered professional engineers employed by the City of New York will be brought up for review before the Board of Directors of the National Society at the fall meeting in San Francisco, October 23-25. The St. Francis Hotel will serve as meeting headquarters.

The Board will be asked to study policies adopted by the New York State Society of Professional Engineers which state that professional employees should be considered separate and apart from non-professionals in any voting to secure, or refrain from, collective bargaining. (See complete story on page 12 of this issue.)

The Directors of the 46,000-member engineering organization will hear James N. Landis, president of the American Society of Mechanical Engineers, speak on "ASME Looks at the Functional Plan." His talk will cover the proposed separation of functions among the existing engineering societies.

A preview showing of the new National Society film "Building for Professional Growth" will be held for the Directors on October 24. The 16mm film covers NSPE activities at the chapter, state, and national levels. The film is available to all NSPE affiliates.

A showing of the United States Steel film "Mackinac Bridge Diary" will also be held at the meeting October 24. This 30-minute, color film depicting the building of the bridge across the Mackinac Straits in Michigan has been made available to NSPE groups for the 1959 National Engineers' Week.

Other business before the Board of Directors will include a report on organizing an annual award program in which NSPE will make an award to the industrial firm having the most outstanding program for professional development for engineering employees.

George Christopher, mayor of San Francisco, is scheduled to give a welcome address at the opening event, a luncheon, Thursday, October 23.

Bert Hirsch, president of the Golden Gate Chapter, is serving as chairman of the Steering Committee in San Francisco.

A varied social program has also been planned for both members and their wives.

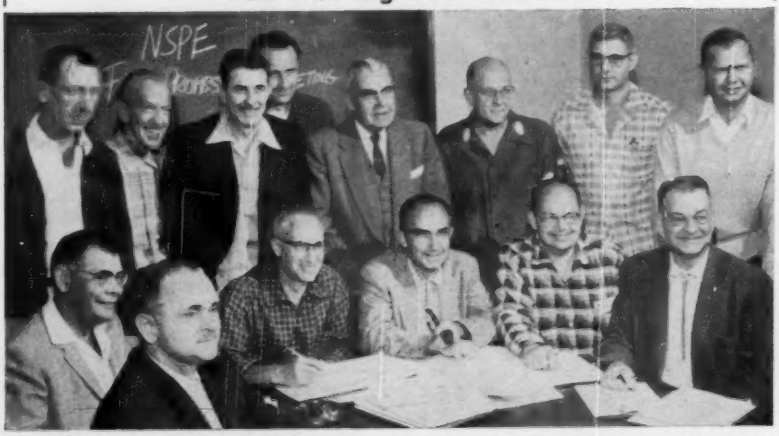
Following is a complete listing of the San Francisco meeting program:

Thursday, October 23, 1958

12:00 noon	Luncheon—Colonial Room
2:30 p.m.	Professional Meeting—California Room

Roll Call of Members of the Board

Fall Meeting Committee



Checking plans for the forthcoming NSPE fall meeting in San Francisco are l.-r., seated: Jack Churhill, Golden Gate Chapter, CSPE; Verne Pemberton, Golden Gate Chapter; Bert Hirsch, chairman of the Steering Committee; Leo Ruth, CSPE president; Jack Sontheimer, CSPE executive secretary; and Douglas Judd, third vice president, CSPE; l.-r., standing: Oliver Deatsch, Stanislaus Chapter; Ralph Daugherty, Santa Clara Valley Chapter; Bob Claghorn, Marin Chapter; Edward Boyer, Diablo Chapter; C. D. Allen, Peninsula Chapter; Nathan Graves, Peninsula Chapter; Kirk Carlton, Golden Gate Chapter, and William Birt, San Joaquin Chapter. The meetings are being held regularly on Saturday mornings (hence, the informal attire) at the Link-Belt Co. in San Francisco.

In an after-hours planning session for the fall meeting are, l.-r.: Leo Ruth, CSPE president; Jack Sontheimer, CSPE executive secretary (standing); Bert Hirsch, chairman of the Steering Committee in charge of the meeting, and Douglass Judd, third vice president, CSPE (standing).

Reading of Minutes of Previous Meeting
Reading of Communications
Report of Officers
President
Executive Director
Treasurer
Report of Executive Committee
October 22-23, 1958, Meeting

PROFESSIONAL DEVELOPMENT GROUP

Vice President Mosher, presiding

Report on Model Law Revisions at NCSBEE Annual Meeting

Robert Williamson, Chairman, Registration Committee

NSPE Scholarship Program

Leland Hobson, Chairman, Scholarship Committee

Student Chapter Program

J. Neils Thompson, Chairman, Student Chapters Committee

Engineering Preparation, Selection, Guidance and Teaching for Engineering Careers

Anatole Gruehr, Chairman, Committee on Engineering Preparation

Local Action Programs of the President's Committee on Engineers and Scientists

Paul H. Robbins, NSPE Executive Director

PROFESSIONAL EMPLOYMENT GROUP

Vice President Hindermann, presiding

Revised Procedure on Ethical Jurisdiction

Revised Procedure on Disciplinary Proceedings

W. L. Hindermann, Vice President

Ethical Studies

Marcus Durlach, Jr., Chairman, Ethical Practices Committee

Future Plans to Enact Jenkins-Keogh Bill

Report on Legal Defense Fund

Leslie C. Gates, Chairman, Functional Section for Consulting Engineers in Private Practice

Engineers in Government Practice

Implementing the Engineers in Government Practice Functional Section
L. N. White, Chairman, Functional Section for Engineers in Government

Engineers in Industry

Distribution of Brochure for Registration of Engineers in Industry
Procedures for Award Program for Outstanding Industrial-Professional Program
Unionization Developments in Industry and Government
Harry P. Cooper, Chairman, Engineers-in-Industry Subcommittee

Policy Statement On Outside Practice

M. Frank Wooten, Chairman, Policy Review Committee

Friday, October 24, 1958

8:00 a.m. Regional Breakfasts
9:00 a.m. Professional Meeting—California Room

PUBLIC RELATIONS GROUP

Vice President McGaughy, presiding

Engineers' Week Programs

John Bahr, Chairman, Engineers' Week Committee

Public Relations

John L. Pratt, Chairman, Public Relations Committee.

Special showing of films:

Building for Professional Growth

The Mackinac Bridge Diary

ORGANIZATIONAL FUNCTIONS GROUP

Vice President Durkee, presiding

Introductory Memberships

Thomas T. Mann, Chairman, Membership Committee

Role of the Technician on the Engineering Team

A. C. Friel, Chairman, Committee on Engineering Technicians

12:00 noon Luncheon—Italian Room
2:00 p.m. Professional Meeting—California Room

PROFESSIONAL RELATIONS GROUP

Vice President Hull, presiding

Implementation of the AIEE Plan

Garvin H. Dyer, Chairman, Inter-Society Relations Committee

Report of AIA Relations

Wm. F. Moehlman, Chairman, Inter-professional Relations Committee

6:30 p.m. Banquet—Colonial Room

Saturday, October 25, 1958

9:00 a.m. Professional Meeting—California Room

POLICY OPERATIONS GROUP

Vice President Easley, presiding

Grass Roots Contacts with Congress

Robert F. Miller, Chairman, Legislative Committee

Professional and Administrative Policies Review

M. Frank Wooten, Chairman, Policy Review Committee

Report of Budget Committee

L. E. Easley, Chairman, Budget Committee

Voluntary Fund Campaign

John Coleman, Chairman, Society Income Committee

Resolutions

Clarence H. Evans, Chairman, Resolutions Committee

New Business

HOTEL RESERVATION REQUEST

NSPE Fall Meeting, Oct. 23-25, 1958

Name .....
(Please Print)

Address .....

City ..... State .....

Arrival Date ..... Hour..... Departure Date .....
(Reservation Held Until 7 P.M. Only Unless Otherwise Indicated)

Type of Accommodation: Single..... Double..... Twin.....
($10-$22) ($12-$20) ($15-$24)

NOTE: To assure confirmation, all reservations must be made at least two weeks in advance.

Signed .....

Date .....

Please mail to St. Francis Hotel, Union Square, San Francisco 19, California

Young Engineers' Month Kit Sent to Officers

Copies of a working kit for state and chapter officials have recently been distributed by the National Society as an aid in promoting programs for Young Engineers' Month in November.

Two copies of the kit have been sent to each chapter president and one to each chapter secretary and national director in an effort to assist chapters who have not developed a Young Engineers' Month program of their own.

By Mrs. Garvin H. Dyer, Chairman of the Ladies Auxiliary Advisory Committee.

As interest in auxiliaries and the work they are doing increases, many new auxiliaries are being organized and many new members added to existing ones. As of July 1st, there were ninety-one auxiliaries. Practically all of these are chapter level auxiliaries, with a few state level ones. There is no national level auxiliary, the only national level body being the Ladies Auxiliary Advisory Committee, consisting of a chairman and six area chairmen, all being elected at the annual meeting held each year in conjunction with the NSPE annual meeting.

The purpose of the Advisory Committee is to advise new groups desiring to organize, supplying them with material prepared by the Committee, and assisting in any way desired. The Committee also is set up to give aid and advice to existing auxiliaries, and to gather news and information to be used by the Committee for publicity.

From its beginning the Committee has been alert to the desirability of uniformity of the many auxiliaries, even though each is completely autonomous. Regardless of local conditions which affect the character of the auxiliary, the number of members varying from just a handful to very large groups and many other conditions which may cause the many auxiliaries to differ, the basic purpose of the existence of the auxiliaries is the same, forming a firm bond which unites them all. This purpose is to promote the interests of the professional engineer. This may be achieved in many ways, but the purpose is still the same.

CAMPAIGN

(Continued from page 39)

quently a tendency for organizations to select their current leaders for positions of responsibility, to the detriment of broad interest among the membership, it was decided to rule out all state and national elected officers.

As a result, it will be only sensible for a panel of judges to review the entire background of each candidate and, for this specific purpose, interested members will be required to submit *with their contribution* a personal résumé of their qualifications. The judges will unquestionably look for the individual who has given something of his time and effort to public welfare, and to his profession and community. They will be interested in the type of work in which a man has recently been engaged, and his participation in civic and fraternal organizations. As usual, the decision of the judges will be final.

The first tour to a new world area will be scheduled for 1959, and the name of the engineer selected will be announced at the winter meeting of the Society in February, 1959. NSPE planners foresee considerable interest on the part of large and small industrial, government, and engineering firms to have one of their employees selected, because the individual and his employer will share with NSPE the collateral benefits derived from contacts made in foreign countries. This is the kind of business and professional public relations which cannot be purchased at any price.

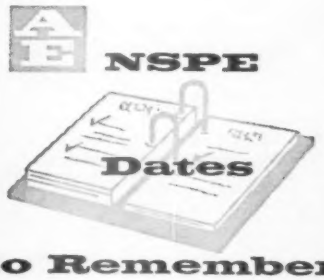
In view of the fact that every member of NSPE, not a state or national officer, has an equal chance for selection to this coveted position, all are urged to become *Dollar-a-Year Engineers* as soon as possible. Any member who failed to receive notice of this fund-raising campaign should immediately contact National headquarters. In order to keep this campaign in perspective, however, remember that *Project Ambassador* is but one of many activities in which NSPE is rightly interested. Funds are needed to advance the whole, broad span of professional engineering, and it is for this purpose that each member should contribute.

Life Membership

William G. Darley, president of Bexar Chapter, Texas Society of Professional Engineers, is shown (left, above) congratulating Ranier H. Knipping upon receiving a Life Membership in the National and Texas Societies of Professional Engineers.

Mr. Knipping attended the initial organization meeting in 1936 which was presided over by Jack Beretta as a member of the National Society. At that meeting he was issued Charter Membership Card No. 18.

Mr. Knipping is retired from the active practice of professional engineering.



to Remember

Washington Society of Professional Engineers—Annual Meeting, October 10-12, 1958, Davenport Hotel, Spokane, Washington.

Virginia Society of Professional Engineers—Annual Meeting, October 16-17, 1958, John Marshall Hotel, Richmond, Virginia.

National Society of Professional Engineers—Fall Meeting, October 23-25, 1958, St. Francis Hotel, San Francisco, California.

National Society of Professional Engineers—Winter Meeting, February 19-21, 1959, Dinkler-Tutwiler Hotel, Birmingham, Alabama.

National Society of Professional Engineers—Annual Meeting, June 17-20, 1959, Commodore Hotel, New York, New York.

Alphabetized by States . . .
Alabama-Maryland

PROFESSIONAL DIRECTORY

PALMER AND BAKER ENGINEERS, INC.
Consulting Engineers—Architects
Surveys, Reports, Design, Supervision, Consultation, Traffic Problems, Tunnels, Bridges, Highways, Airports, Industrial Buildings, Waterfront & Harbor Structures, Complete Soils, Materials & Chemical Laboratories.
Mobile, Ala. New Orleans, La.
Washington, D. C.

FRANKLIN ENGINEERING
Physicists, Engineers
Plans, specifications, investigations, reports. Consultants in design of research facilities and special equipment
Power distribution, Control, High Voltage, Emergency power, Nuclear shielding
977 Commercial Street Palo Alto, Calif.
Phone Yorkshire 8-2613

INTERNATIONAL ENGINEERING COMPANY, INC.
Design and Consulting Engineers
Dams — Power Plants — Tranmission Lines
Railroads — Highways
Investigations — Reports — Plans and Specifications — Cost Estimates — Supervision of Construction
74 New Montgomery Street
San Francisco 5, Calif.

KAISER ENGINEERS
Division of Henry J. Kaiser Company
ENGINEERS — CONTRACTORS
1924 Broadway, Oakland 12, California

MINER AND MINER
Consulting Engineers
Incorporated
Greeley, Colo. Littleton, Colo.

JOHN J. MOZZOCHI AND ASSOCIATES
Highways — Airports — Developments
Survey — Design — Inspection
265 Hebron Avenue Glastonbury, Conn.

ELI M. LURIE, P. E.
Consulting Electrical Engineer
Hotel and Auditorium Sound. Industrial Communications, Public Address, Centralized Radio, Master Television Antennae Systems, Closed Circuit TV & Signal Systems. Complete Design, Planning and Specifications.
9349 Abbott Ave. Surfside, Fla. JEfferson 8-3503
280 Broadway New York City REctor 2-0319

BROCKWAY, WEBER & BROCKWAY, INC.
George S. Brockway Roy E. Weber
George R. Brockway
Staff
H. L. Fitzgerald T. A. Clark C. A. Anderson
R. E. Owen B. E. Whittington
Civil, Structural, Sanitary, Municipal, Electrical
West Palm Beach, Florida

SOUTH FLORIDA TEST SERVICE
Testing—Inspection—Research—Engineers
Consultants and specialists in corrosion, weathering and sunlight testing.
4201 N.W. 7th Street Miami 44, Florida
Member A. C. I. L.

HAYNES AND EDWARDS
Consulting Engineers
Design and Supervision • Buildings
Bridges • Stadiums • Docks • Piers
Parking Garages • Prestress Plants
PRESTRESSED CONCRETE
Reinforced Concrete • Structural Steel
PO Box 1053 MUtual 8-5631 Lakeland, Fla.

LAW ENGINEERING TESTING COMPANY
Foundation Investigations
Physical & Chemical Testing
Main Laboratories: Atlanta, Ga.
Charlotte, N. C., Albany, Ga., Tampa, Fla.

PROFESSIONAL ENGINEERS
Put your card here
Keep your name before more than 50,000 readers. It's good business.

ROBERT AND COMPANY ASSOCIATES
Consulting and Designing Engineers
Industrial Plants—Municipal, Highway and Airport Improvements — Power Plants — Water Supply — Sewage and Industrial Waste Disposal — Appraisals — Reports.
Atlanta, Georgia

HOMER L. CHASTAIN & ASSOCIATES
Consulting Engineers
Civil, Structural, Mechanical, Industrial Design & Supervision, Construction, Engineering, Turnpikes, Bridges, Water Supply, Sewerage, Flood Control & Drainage, Material Controls, Municipal Engineering, Topographic Surveys.
155½ West Main Street Decatur, Illinois

CONSOER, TOWNSEND and ASSOCIATES
Water Supply, Sewerage, Flood Control and Drainage, Bridges, Express Highways.
Paving, Power Plant, Appraisals, Reports, Traffic Studies, Airports, Gas & Electric Transmission Lines
360 East Grand Avenue, Chicago 11, Illinois
9½ N. Indiana St., Greencastle, Ind.

DE LEUW, CATHER & COMPANY
Consulting Engineers

Public Transit	Subways
Traffic & Parking	Railroad Facilities
Expressways	Industrial Plants
Grade Separations	Municipal Works
Urban Renewal	Port Development

150 North Wacker Drive, Chicago 6, Ill.
San Francisco Toronto Oklahoma City

PLUMB, TUCKETT & PIKARSKY
Consulting Engineers—Architects
Railroad & Highway Bridges
Industrial & Commercial Buildings
2649 Wabash Avenue Gary 3, Indiana
25 E. Jackson Blvd. Chicago 4, Illinois

SARGENT & LUNDY
Engineers
Steam and Electric Power Plants for Utilities and Industrials
Design • Supervision
Studies • Reports
140 South Dearborn Street
Chicago 3, Illinois
FRanklin 2-7130

SOIL TESTING SERVICES, INC.
Consulting Engineers
Soil Investigation—Laboratory Testing
Engineering Reports and Recommendations
1827 N. Harlem Avenue, Chicago 35, Illinois
Milwaukee; Portland, Michigan; San Francisco; Kenilworth, N. J.; Havana, Cuba

STANLEY ENGINEERING COMPANY
Consulting Engineers
Hershey Building Muscatine, Iowa
208 S. LaSalle St. Chicago 4, Illinois

WIGHT AND COMPANY
Consulting Engineers
Bridges, Express Highways, Paving, Water Systems, Sewage and Waste Disposal, Flood Control and Drainage, Airports and Buildings, Site Planning, Reports.
1038 Curtiss St., Downers Grove, Ill.
301 E. Main St., Barrington, Ill.

CHAS. W. COLE & SON
Engineers—Architects
South Bend, Indiana

WILSON & COMPANY
Engineers & Architects
REPORTS—PLANNING—DESIGN—SUPERVISION
Airfields, Highways, Streets, Flood Control, Dams, Drainage, Water Supply, Sewerage, Buildings, Industrial Plants, Power Plants, Electrical Distribution.
631 E. Crawford Salina, Kansas

OAKLE P. BULLOCK
Consulting Engineers
AIR DISTRIBUTION
Unusual Problems or Designs
Present or New Systems
New or Old Buildings
Consultations, Designs, Surveys, Reports
254 Laura Wichita 7, Kansas

BEDELL & NELSON ENGINEERS
Incorporated
Consulting Engineers-Architects
Design—Supervision—Reports

Airports	Highways & Bridges
Buildings	Industrial Plants
Bulk Terminals	Municipal Works
City Planning	Subdivisions
Docks & Wharves	Utilities

1200 St. Charles Ave. New Orleans, La.

EUSTIS ENGINEERING COMPANY
FOUNDATION AND SOIL MECHANICS INVESTIGATIONS

Soil Borings	Laboratory Tests
Foundation Analyses	Reports

3635 Airline Highway
Metaire, Louisiana

WHITMAN, REQUARDT & ASSOCIATES
Engineers — Consultants
Civil—Sanitary—Structural
Mechanical—Electrical
Reports, Plans Supervision, Appraisals
1304 St. Paul Street, Baltimore 2, Maryland

PROFESSIONAL DIRECTORY

Alphabetized by States . . .
Massachusetts-New York

FAY, SPOFFORD & THORNDIKE, INC.
Engineers
Airports, Bridges, Express Highways
Water Supply, Sewerage, Drainage
Port and Terminal Works, Industrial Plants
Investigations, Reports, Designs
Supervision of Construction
Boston, Massachusetts

METCALF & EDDY
Engineers
Water, Sewage, Drainage, Refuse and Industrial Wastes Problems
Airports Valuations
Laboratory
Statler Building Boston 16, Mass.

COMMONWEALTH ASSOCIATES INC.
Consulting and Design Engineers
Power Generation
Electric—Gas—Water Systems
Industrial Planning
209 E. Washington Ave., Jackson, Michigan

THE HINCHMAN CORPORATION
Consulting Engineers
CORROSION CONTROL
Survey—Designs—Specifications
Evaluations
Francis Palms Building
Detroit 1, Michigan

BLACK & VEATCH
Consulting Engineers
Water—Sewage—Electricity—Industry
Reports, Design
Supervision of Construction
Investigations, Valuation and Rates
1500 Meadow Lake Parkway
Kansas City 14, Missouri

BURNS & McDONNELL
Engineers—Architects—Consultants
P.O. Box 7088 Kansas City, Mo.
Telephone DElmar 3-4375

A. C. KIRKWOOD & ASSOCIATES
ENGINEERS
CONSULTANTS
7800 The Paseo
Kansas City 10, Mo.

RUSSELL & AXON
Consulting Engineers
Civil—Sanitary—Structural
Industrial—Electrical
Rate Investigations
408 Olive St., St. Louis 2, Mo.
Municipal Airport, Daytona Beach, Fla.

SVERDRUP & PARCEL, INC.
Engineers—Architects
Bridges—Structures—Highways
Industrial and Power Plant Engineering
915 Olive Street, St. Louis 1, Mo.
417 Montgomery St., San Francisco, Calif.

EDW. J. ADAMEC, P. E.
Consulting Engineer
DESIGNS ERECTION METHODS
Bridges and Structures
Foundations
Inspections and Reports
Fabricators Details
4-15 Banta Pl., P.O. Box 521, Fair Lawn, N. J.

FRANK E. HARLEY AND ASSOCIATES
Water Works, Sewage, Municipal Highways
Harley Building
860 Godwin Avenue Wyckoff, N. J.

Subsurface Investigations
WARREN GEORGE
Henry D. Hammond, P. E.
Any Type Borings Any Site
Preliminary Surveys Reports
95 River St. Hoboken, N. J.

AMMANN & WHITNEY
Consulting Engineers
Design and Supervision of Construction of Bridges, Highways, Expressways, Buildings, Special Structures, Airport Facilities.
111 Eighth Avenue, New York 11, N. Y.
724 E. Mason Street, Milwaukee 2, Wisc.

ANDREWS & CLARK
Consulting Engineers
305 East 63rd Street
New York 21, N. Y.

BURNS AND ROE, INC.
Engineering, Design, Plans and Specifications — Reports, Cost Estimates — Construction Supervision — Power Generating Plants: Steam, Nuclear, Hydro, Diesel — Aviation Test and Missile Support Facilities — Research and Development — Nuclear, Chemical, Industrial Plants.
160 West Broadway New York 13, N. Y.

FOSTER & CAFARELLI
Engineers
Port Development, Shipyards, Drydocks, Power Plants, Distribution Systems, Industrial Plants, Commercial Buildings, Surveys, Reports, Estimates, Design, Supervision, Consultation
44 Whitehall Street, New York 4, N. Y.

PROFESSIONAL ENGINEERS
Put your card here
Keep your name before more than 50,000 readers. It's good business.

HARDESTY & HANOVER
Consulting Engineers
Bridges—Long Spans of All Types
Movable—Lift, Bascule and Swing
Hanover Skew Bascule, Steel and Concrete Spans
Grade Crossing Eliminations
Expressways and Thruways
Other Structures, Foundations
Supervision, Reports, Appraisals
101 Park Avenue New York 17, N. Y.

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance	$ 96.00
12 mos., billed monthly @ $9.00 ea.	108.00
6 mos., paid in advance	54.00
6 mos., billed monthly @ $10.00 ea.	60.00

FREDERIC R. HARRIS, INC.
Consulting Engineers
Economic Surveys and Reports
Engineering Investigations and Reports
Design and Supervision of Construction
Port and Harbor Facilities • Highways, Expressways and Bridges • Power and Industrial Plants • Airport Facilities
27 William St. New York 5, N. Y.
1915 Tulane Ave. New Orleans, La.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers
Bridges, Structures, Foundations
Express Highways
99 Church Street New York 7, N. Y.
1805 Grand Avenue Kansas City 8, Mo.

MADIGAN-HYLAND
Consulting Engineers
28-04 41st Avenue
Long Island City, New York

PROFESSIONAL ENGINEERS
Put your card here
Keep your name before more than 50,000 readers. It's good business.

MORAN, PROCTOR, MUESER & RUTLEDGE
Consulting Engineers
Foundations for Buildings, Bridges and Dams; Tunnels, Bulkheads, Marine Structures; Soil Studies and Tests; Reports, Design and Supervision.
415 Madison Ave., New York 17, N. Y.
Eldorado 5-4800

THE C. W. NOFSINGER CO.
Engineers & Contractors
307 East 63rd St. EM 3-1460
Kansas City 13, Mo.

JAMES P. O'DONNELL
Engineers
Professional Engineering for the Petroleum and Process Industries
39 Broadway, New York 6, N. Y.

PARSONS, BRINCKERHOFF, HALL & MACDONALD
Engineers
Bridges, Highways, Tunnels, Airports, Subways, Harbor Works, Dams, Canals, Traffic, Parking and Transportation Reports, Power, Industrial Buildings, Housing, Sewerage and Water Supply.
165 Broadway, New York 6, N. Y.

Alphabetized by States . . .
New York-Pennsylvania

PROFESSIONAL DIRECTORY

PRAEGER-KAVANAGH

Engineers

126 East 38th St. New York 16, N. Y.

SEELYE STEVENSON VALUE & KNECHT

Consulting Engineers
Richard E. Dougherty, Consultant
Airports, Highways, Bridges, Dams, Water Supply, Sanitation, Tunnels, Industrial Plants, Concrete, Steel, Industrial Waste Disposal, Foundations, Soil Studies.
CIVIL—MECHANICAL—ELECTRICAL
101 Park Avenue New York 17, N. Y.

SINGSTAD & BAILLIE

Consulting Engineers
Ole Singstad David G. Baillie, Jr.
Tunnels, Subways, Highways, Foundations, Parking Garages, Investigations, Reports, Design Specifications, Supervision
24 State St. New York 4, N. Y.

D. B. STEINMAN

Consulting Engineer
HIGHWAYS — BRIDGES — STRUCTURES
Design — Construction — Investigation
Strengthening — Reports — Advisory Service
117 Liberty Street New York 6, N. Y.

SYSKA & HENNESSY, INC.

Engineers
Heating Ventilating Air Conditioning
Electric & Sanitation
Design Reports Consultation
NEW YORK, N. Y.

TIPPETTS-ABBETT McCARTHY-STRATTON

Engineers
Ports, Harbors, Flood Control, Irrigation Power, Dams, Bridges, Tunnels, Highways, Subways, Airports, Traffic Foundations, Water Supply, Sewerage, Reports, Design Supervision, Consultation
62 West 47th Street New York City

WATER SERVICE LABORATORIES, INC.

Chemical Engineers
Specialists in Water Treatment
Consulting and Technical Services
Main Office: 615 W 131 St., N. Y. 27, N. Y.
Offices also in: Phila., Wash., & Richmond

ADACHE ASSOCIATES, INC.

ENGINEERS
Penthouse, Hotel Hollenden
Cleveland 14, Ohio

HARRY BALKE ENGINEERS

Consulting Engineers
Consulting Service—Reports, Design, Supervision, Research
Bridges, Buildings, Structures, Toll Roads, Expressways, Highways
2330 Victory Parkway
Cincinnati 6, Ohio

E. D. BARSTOW & ASSOCIATES

E. D. Barstow—T. A. Gilliam
Water Supply, Sewerage, Highways, Structures, Industrial
163 N. Union Street Akron 4, Ohio

ELMER S. BARRETT ASSOCIATES

Consulting Engineers
Surveys—Design—Inspection
Highways Municipal
Railroads Reports
Bridges
249 S. Paint St. Chillicothe, Ohio
Phone PRospect 3-2287

GUSTAVE M. GOLDSMITH

Consulting Engineer
General Structures Plant Layout
Design—Investigation—Quantity Surveys
1734 Bella Vista Cincinnati 37, Ohio

CONSULT
THIS
DIRECTORY
FOR
QUALIFIED
CONSULTANTS

JONES, HENRY & WILLIAMS

Consulting Sanitary Engineers
Water Works
Sewerage and Treatment
Waste Disposal
Security Bldg. Toledo 4, Ohio

ELMER A. KISH

Consulting Engineer
Consulting, Design, Investigations, Reports
3608 Euclid Ave.
Cleveland 15, Ohio

H. R. RICHARDS—A. V. ALEXEFF & ASSOCIATES

Consulting — Design
Development — Fabrication
Continuous Processing Machinery
INDUSTRIAL OVENS, INC.
13825 Triskett Rd., Cleveland 11, Ohio
Tel. CL 1-4400

JOHN OSTBORG

Engineer Designer
Diesel Engine Design Consultant
Mechanical Engineering & Design Service
31 E. High Street Springfield, Ohio

TOLEDO TESTING LABORATORY

Engineers and Chemists
Concrete — Soils — Asphalt
Inspection — Tests — Supervision
Consultation — Specifications and Investigation of
Engineering Works and Materials
1810 North 12th St. Toledo 2, Ohio

VOGT, IVERS, SEAMAN & ASSOCIATES

Design and supervision of Municipal and Industrial Facilities: Bridges, Highways, Expressways; Buildings, Special Structures, Airports; Diesel, Hydro-Electric, Steam, Power Facilities; City Planning and Reports.
34 West Sixth Street, Cincinnati 2, Ohio
20 North Wacker Drive, Chicago 6, Ill.

OKLAHOMA TESTING LABORATORIES

Registered Engineers—Chemists
Oklahoma City, Okla.
Materials Testing and Inspection
Member A. C. I. L.
C. A. Lashbrook M. A. Witte
Owner-Director Chief Engineer

ALBRIGHT & FRIEL, INC.

CONSULTING ENGINEERS
Water, Sewage, Industrial Wastes and Incineration Problems, City Planning, Highways, Bridges and Airports, Dams, Flood Control, Industrial Buildings, Investigations, Reports, Appraisals and Rates.
Three Penn Center Plaza
Philadelphia 2, Pa.

MICHAEL BAKER, JR., INC.

Consulting Engineers
Highways, Airports, Waterworks, Sewers, Sewage Treatment, City Planning, Surveys, Photogrammetric Mapping.
Baker Building—Rochester, Penna.
Branch Offices
Harrisburg, Pa., Jackson, Miss., College Park, Maryland

BUCHART ENGINEERING CORP.

Consulting Engineers
Highways — Bridges — Sewer Systems — Surveys
Water Works — Dams — Reports — Supervision
Industrial — Municipal — Structures
55 S. Richland Ave., York, Pa.
Lancaster, Pa. Washington, D. C.

BUCKNELL ENGINEERING CO.

Consulting Engineers
INDUSTRIAL—DESIGN—MANAGEMENT
Chemical and Industrial Plant Design, Piping Systems, Chemical Equipment Design, Chemical Process, Mechanical Design, Structures, Tank Farms, Material Handling, Production Control, Operation Savings.
Keystone Building, Pittsburgh 22, Pa.

AUBURN & ASSOCIATES, INC.

Engineers for Heavy Industry
Electrical, Civil, Mechanical and Piping Professional Staff
A. J. Mosso, P.E. B. J. Auburn, P.E.
H. G. Smith, P.E. C. W. Oettinger, P.E.
W. B. Kennedy, P.E. M. P. Wodzianski, P.E.
J. F. Schaffer, P.E. J. W. Gilder, P.E.
923 Penn Avenue Pittsburgh 22, Pa.

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance	$ 96.00
12 mos., billed monthly @ $9.00 ea.	108.00
6 mos., paid in advance	54.00
6 mos., billed monthly @ $10.00 ea.	60.00

PROFESSIONAL DIRECTORY

Alphabetized by States . . .
Pennsylvania-West Virginia

CAPITOL ENGINEERING CORPORATION

Engineers—Constructors—Management

Design and Surveys Roads and Streets
Sewer Systems Water Works
Planning Airports
Bridges Turnpikes Dams

Executive Offices: Dillsburg, Pennsylvania
Washington, D. C. **Pittsburgh, Pa.**
Dallas, Texas **Paris, France**

FRAZIER-SIMPLEX, INC.

CONTRACTING & CONSULTING ENGINEERS

Furnace Engineering for the Glass and Steel Industries

486 East Beau Street, WASHINGTON, PA. U. S. A.

GILBERT ASSOCIATES, INC.

Consulting Engineers and Designers

Public Utility & Industrial Plant Engineers
Water Works and Sanitary Engineering
Direction of Construction
Safety Engineering
Business and Economic Research
Property Valuation
Public Utility Rate Regulation

New York **Reading, Pa.** **Washington**

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance .....$ 96.00
12 mos., billed monthly @ $9.00 ea.. 108.00
6 mos., paid in advance 54.00
6 mos., billed monthly @ $10.00 ea. 60.00

GANNETT, FLEMING, CORDDRY & CARPENTER, INC.

Engineers

Water, Sewage, Roads, Turnpikes
Bridges, Airports, Traffic, Appraisals
HARRISBURG, PA.

Philadelphia, Pa. **Daytona Beach, Fla.**
Pittsburgh, Pa. **Medellin, Colombia, S. A.**

GREEN ENGINEERING COMPANY

Consulting Engineers

Highways, Bridges, Buildings
Water and Sewage
Industrial Plants

Sewickley, (Pittsburgh) Pa.
Boston, Mass. **Baltimore, Md.**

ELECTRICAL CONTRACTORS ASSOCIATES, INC.

Contracting Electrical Engineers

Altoona, Penna.

PROFESSIONAL ENGINEERS

Put your card here

Keep your name before more than 50,000 readers. It's good business.

HALL LABORATORIES, INC.

DIV. OF HAGAN CHEMICALS & CONTROLS, INC.

Consultants on Industrial Water Problems

Boiler Water Conditioning, Cooling
Water Treatment, Process and
Waste Water Engineering Service
Dust Collection Particle Size Analysis

Hagan Building **Pittsburgh 30, Pa.**

HARRIS, HENRY & POTTER, INC.

Consulting — Design — Reports
Mechanical — Electrical — Civil
Architectural

Spring Valley **R.D. 3, Doylestown, Pa.**

THE KULJIAN CORPORATION

Engineers • Constructors • Consultants

POWER PLANTS
(Steam, Hydro, Diesel)

Oil Refineries, Pipe Lines • Chemical Plants • Textile Plants • Breweries, Food Processing Plants • Airports • Hangars
Army, Navy Installations

1200 No. Broad St., Philadelphia 21, Pa.

D. C. LATELLA & ASSOCIATES, INC.

INDUSTRIAL ENGINEERS

Management Consultants

Widener Bldg. **Philadelphia, Pa.**

LAWRIE & GREEN & ASSOCIATES

Architectural and Engineering Offices

321 N. Front Street

Harrisburg, Pennsylvania

Ritchie Lawrie, Jr., P.E., Consulting Engineer

MODJESKI AND MASTERS

Consulting Engineers

G. H. Randall J. R. Giese
F. M. Masters H. J. Engel

Design and Supervision of Construction
Inspection and Reports
Bridges, Structures and Foundations

900 N. Sixth St. **New Orleans, La.**
Harrisburg, Pa. **Philadelphia, Pa.**

V. C. PATTERSON & ASSOCIATES, INC.

Engineers
Refrigeration Specialists

Warehouses—Refrigeration & Installation
Food Freezing—Low Temp. Refrigeration
Patented System for Correction of Frost-heaved Floors

415 W. Market Street **York, Penna.**

PITTSBURGH TESTING LABORATORY

Testing—Inspection—Analysis

Radiography—Soils Mechanics

Main Office, Pittsburgh, Pa.

32 Laboratories in Principal Cities

CYRUS WM. RICE & CO., INC.

Consulting Chemical Engineers

Industrial Water and Waste

16 Noble Avenue, Pittsburgh 5, Penna.

EMERSON VENABLE

Chemist and Chemical Engineer

Chemical Analysis

Research — Development
Trouble Shooting

6111 Fifth Ave., Pittsburgh 32, Pa.

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance .....$ 96.00
12 mos., billed monthly @ $9.00 ea. 108.00
6 mos., paid in advance 54.00
6 mos., billed monthly @ $10.00 ea. 60.00

THOMAS E. DUCE ASSOCIATES

Consulting Engineers

Electrical and Mechanical

109 N. Chaparral St.
Corpus Christi, Tex.

ENGINEERS TESTING LABORATORY, INC.

Soil Mechanics and Foundation Engineering

Soil Borings Laboratory Tests
Foundation Analyses Reports

2116 Canada Dry St., Houston 23, Texas
444 North 9th Street, Baton Rouge, La.

FORREST and COTTON, INC.

Consulting Engineers

Regional Water Supplies
Water and Sewage Works
Industrial Development
Airports — Dams
Appraisals — Reports

600 Vaughn Building **Dallas 1, Texas**

FREESE & NICHOLS

407 Danciger Bldg.
Fort Worth, Texas

FREESE, NICHOLS & TURNER

2111 C & I Bldg.

Houston, Texas

Consulting Engineers

LOCKWOOD, ANDREWS & NEWNAM

Consulting Engineers

Water Works, Sewerage & Sewage Disposal, Public Works, Structures, Earthworks, Mechanical & Electrical.
Reports—Design—Supervision
Surveys—Valuations

Corpus Christi—Houston—Victoria, Texas

PRESTRESSING RESEARCH & DEVELOPMENT, INC.

Prestressed Concrete Design
Bridges • Buildings • Waterfront Structures
Arches, Shells, Domes

1511 Transit Tower **San Antonio, Texas**

FERGUSON-GATES ENGINEERING CO.

Registered Professional
Civil and Mining Engineers

Coal Property Reports — Valuation — Development — Plant Design — Ventilation

Allen Building **P. O. Box 672**
CLifford 2-5338 **Beckley, W. Va.**

PROFESSIONAL DIRECTORY RATES

12 mos., paid in advance .....$ 96.00
12 mos., billed monthly @ $9.00 ea.. 108.00
6 mos., paid in advance 54.00
6 mos., billed monthly @ $10.00 ea. 60.00

. . . Supplemental Services . . .

PROFESSIONAL ENGINEERS

Put your card here

Keep your name before more than 50,000 readers. It's good business.

ELLMANN ENGINEERING CO., INC.
Electrical Engineers

Designers and Manufacturers of Automatic Control, Alarms and Supervisory Systems for Industrial, Commercial and Institutional Applications.

P. O. Box 3627 Washington 7, D. C.

BUILDERS ESTIMATING SERVICE, INC.

Specialists in preparation of Budget, Control, preliminary & final estimates. Army, Navy & Air Force installations
120 Greenwich Street
New York 6, N. Y.
Telephone Number
Rector 2-4187

PROFESSIONAL DIRECTORY

RATES

12 mos., paid in advance	$ 96.00
12 mos., billed monthly @ $9.00 ea.	108.00
6 mos., paid in advance	54.00
6 mos., billed monthly @ $10.00 ea.	60.00

GILES DRILLING CORPORATION

Subsurface Explorations
Large Calyx Holes in Rock
Engineering Geology Reports
2 Park Avenue New York 17, N. Y.

CONSULT
THIS
DIRECTORY
FOR
QUALIFIED
CONSULTANTS

PHILIP J. HEALEY, INC.
Engineers and Contractors
TEST BORINGS
CORE DRILLING for FOUNDATIONS
207 Baldwin Ave., Jersey City 6
Jo. Sq. 2-3313
11 Park Place, New York 7
Ba. 7-2728

PHOTRONIX, INC.
Aerial Photogrammetry and Electronic Computation
For Engineers, By Engineers
790 King Avenue Everett S. Preston
Columbus 12, Ohio Chief Engineer

SPRAGUE & HENWOOD, INC.
Drilling Services
Foundation Investigations, Test Boring
Grout Hole Drilling and Pressure Grouting
Diamond Core Drilling
221 W. Olive St., Scranton, Pa.
New York, Phila., Pittsburgh, Atlanta
Grand Junction, Colorado
Buchans, Newfoundland

PENNSYLVANIA DRILLING COMPANY
Subsurface Explorations • Grouting
Industrial Water Supply • Mineral Prospecting
Large Diameter Drilled Shafts
1205 Chartiers Ave. Pittsburgh 20, Pa.

AERIAL MAP SERVICE CO.

Topographic, Planimetric, Photo Maps for Highways, Mining, Resources, Construction. City Maps, Tax Maps, Photo Geology. Tellurometer Radio Distance Measurements, Triangulation, Electronic Computation.
1016 Madison Ave. Pittsburgh 12, Pa.

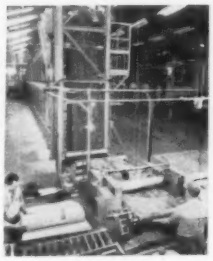
Advertisers' Index

Adache Associates, Inc.	48	Franklin Engineering	46	James P. O'Donnell	47
Edw. J. Adamec	47	Frazier-Simplex, Inc.	49	Oklahoma Testing Laboratories	48
Aerial Map Service Co.	50	Freese & Nichols	49	John Ostborg	48
Albright & Friel, Inc.	48	Gannett, Fleming Corddry & Carpenter, Inc.	49	Palmer & Baker Engineers, Inc.	46
Allied Radio Co.	9	Gilbert Associates	49	Parsons, Brinckerhoff, Hall & MacDonald	47
Alvin and Co.	14	Giles Drilling Corporation	50	V. C. Patterson & Associates	49
Ammann & Whitney	47	Gustave M. Goldsmith	48	Pennsylvania Drilling Co.	50
Andrews and Clark	47	Green Engineering Co.	49	Photronix, Inc.	50
Auburn and Associates, Inc.	48	Greenwich Book Publishers	11	Pittsburgh Testing Laboratory	49
Michael Baker, Jr., Inc.	48	Hall Laboratories, Inc.	49	Plumb, Tuckett & Pikarski	46
Harry Balke Engineers	48	Hardesty & Hanover	47	Portland Cement Assn.	2
Elmer S. Barrett Associates	48	Frank E. Harley & Associates	47	Praeger-Kavanagh	48
E. D. Barstow & Associates	48	Frederic R. Harris, Inc.	47	Prestressing Research & Development, Inc.	49
Bedell and Nelson	46	Harris, Henry & Potter, Inc.	49	Cyrus Wm. Rice & Co., Inc.	49
Biltmore Hotel	4	Haynes and Edwards	46	Robert and Company Associates	46
Black & Veatch	47	Philip J. Healey, Inc.	50	Ross-Martin Co.	13
Borden Metal Products Co.	16	The Hinchman Corporation	47	Russell and Axon	47
Brockway, Weber & Brockway, Inc.	46	Howard Needles, Tammen & Bergendoff	47	Sargent & Lundy	46
Buchart Engineering Corp.	48	Industrial Ovens, Inc.	48	Victor O. Schinnerer	8
Bucknell Engineering Co.	48	International Engineering Co., Inc.	46	Seelye Stevenson Value & Knecht	48
Builders Estimating Service, Inc.	50	Jones, Henry & Williams	48	Singstad & Baillie	48
Oakle P. Bullock	46	Kaiser Engineers	46	Soil Testing Services, Inc.	46
Burns & McDonnell	47	A. C. Kirkwood & Associates	47	South Florida Test Service	46
Burns & Roe, Inc.	47	Elmer A. Kish	48	Sprague & Henwood, Inc.	50
Capitol Engineering Corporation	49	Kuljian Corporation	49	Stanley Engineering Company	46
Homer L. Chastain & Associates	46	D. C. Latella & Associates	49	D. B. Steinman	48
Chas. W. Cole & Son	46	Law Engineering Testing Co.	46	Sverdrup & Parcel, Inc.	47
Commonwealth Associates, Inc.	47	Lawrie & Green & Associates	49	Syska & Hennessy, Inc.	48
Consoer, Townsend and Associates	46	Lockwood, Andrews & Newnam	49	Tippetts-Abbett-McCarthy-Stratton	48
De Leuw Cather & Company	46	Eli M. Lurie	46	Toledo Testing Laboratory	48
Thomas E. Duce Associates	49	Madigan-Hyland	47	Emerson Venable	49
Electrical Contractors, Assoc., Inc.	49	Metcalf & Eddy	47	Vogt, Ivers, Seaman & Associates	48
Ellmann Engineering Co., Inc.	50	Miner and Miner	46	Warren George	47
Engineers Testing Laboratory, Inc.	49	Modjeski and Masters	49	Water Service Laboratories, Inc.	48
Eustis Engineering Company	46	Moran, Proctor, Mueser & Rutledge	47	Whitman, Requardt and Associates	46
Fay, Spofford & Thorndike	47	John J. Mozzochi & Assoc.	46	Wight & Co.	46
Ferguson-Gates Engineering Co.	49	The C. W. Nofsinger Co.	47	Wilson & Company	46
Forrest and Cotton, Inc.	49				
Foster & Cafarelli	47				

Progress in Products

ROOFING — Item 30

A new roofing material is being produced by Owens-Corning Fiberglas Corp. A combination of Perma Ply glass felt (the new material) and asphalt provides roofers for the first time with a non-rotting, monolithic roof. Hot moppings of bitumen soak through the porous Perma Ply sheet of fibrous glass to make a single-layered roof which resists cracking and blisters, assures long life and guarantees low maintenance.

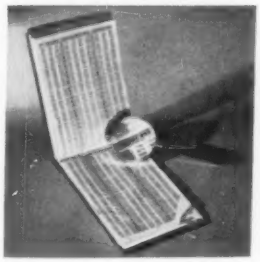


SURFACING MATERIAL — Item 31

A new structural surfacing material, "Permatop," said to be harder than concrete, resists industrial corrosion, and literally welds to new or old masonry, has been put on the market. Providing mineral aggregate and plastic binder in a single package, it can be used to rebuild masonry floors in factories, and other buildings, and for repairing heavy-duty roadways, walkways, and ramps. The product's main advantage is the fact that it adheres tenaciously to any clean, cured masonry surface, old or new, it is claimed.

MATH-O-MATIC — Item 32

Useful to engineers is a new 224-page book of ingenious tables called the "Math-O-Matic." The volume makes short work of tough problems in multiplication, division and percentage. It also solves at a glance many intricate problems in square root, cube root, logarithms, etc. Included are reciprocals and pi products of all numbers from 1 to 1000.



ALL-WEATHER MOTOR — Item 33

The Louis Allis Co. has introduced a new Weather Protected Vertical Motor intended for outdoor operation under all weather conditions including hurricane winds, driving rain, snow, sleet and wind-blown sand. The motor meets NEMA Type II Weather Protected specifications and is manufactured in ratings from 250 to 2000 HP, in both hollow shaft and solid shaft construction. Primary uses for the motor are in chemical and petroleum processing, irrigation, municipal and other industrial applications in which vertical motors must operate without shelter or additional protection.

PHOTOCOPIER — Item 34

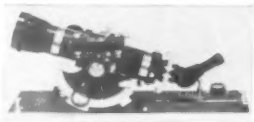
A compact office photocopy machine combining a unique "speed feed" feature, superior performance and an economy price tag has been unveiled by American Photocopy Equipment Co. Lightweight and portable, the new APECO Director "Auto-Stat" has the versatile copying capacity of a much larger unit. The desk-top model will reproduce any original office-sized document in approximately 19 seconds.

DRAFTING AIDS — Item 35

More time-saving conveniences for making printed circuit master drawings have been provided by the addition of decimal sizes and several new shapes to By-Buk Company's line of black or white pressure sensitive donut pads, teardrops, corners, "T's" and narrow tape. The corners are nests of four concentric rings from which segments may be cut to provide any desired angle and radius for drawing printed wiring when used with narrow tape of the corresponding width. Black pressure sensitive tape is slit to any fractional or decimal width in full 60-yard rolls by a precision slitting technique, claimed to be exclusive.

ELBOW EYEPIECE — Item 36

A new elbow eyepiece has been added to the Gurley Alidade, it has been announced by W. & L. E. Gurley. The eyepiece was developed to fill the need for an instrument which will be easier to read in the field. It extends in a diagonal direction from the end of the Alidade telescope. It can be rotated in any position and read from either side.



SEALING COMPOUND — Item 37

A non-oxidizing, non-shrinking sealing compound, "Parmastic," for curtain-wall, window-wall, and other applications where a permanently resilient seal is mandatory, has been developed. Intended primarily for exterior exposure, "Parmastic" is reported to have unusually tenacious adhesion, and will bond to all types of clean, dry surfaces such as glass, aluminum, stainless steel, porcelain enamel and other. Due to its lasting rubbery texture and excellent adhesive qualities, "Parmastic" will survive vibration and expansion-contraction cycles much better than conventional type sealers, it is claimed.

This column describes new products of general interest to professional engineers. For further information, circle the item number on the Readers' Service Card and mail to AMERICAN ENGINEER.

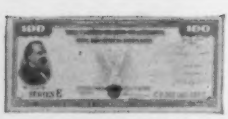
These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

EUGENE B POWER
UNIVERSITY MICROFILMS
313 NORTH FIRST ST
ANN ARBOR MICH
COMP T 71555

We learned a lesson from a lineman

"*Safety* is where I shine," one of our linemen told us recently. "Safety's one of the most important parts of my job. But *saving*—and that's important, too, for a family man—that's too tough. Why don't you guys in the office make it easy for us—like that Payroll Savings Plan for U.S. Savings Bonds?"

Of course, that is *exactly* what we want to do for *every one* of our people. We explained that to our lineman. But he certainly made us stop and think. Because if *he* didn't know about our plan for buying U.S. Savings Bonds through Payroll Savings, then many other employees must be in the same position.

We telephoned our State Savings Bond Director for help. He worked out a company-wide campaign for us. Application cards were placed in the hands of every person on our payroll. We had a *fair* participation when the campaign started. But within days afterward, we had an *excellent* percentage of bond buying employees.

It shows that practical people welcome a chance to set up this sound savings plan. Today, particularly, there are more payroll savers than ever before in peacetime. Look up *your* State Director in the phone book or write: Savings Bonds Division, U.S. Treasury Dept., Washington, D. C.